Australian Government

UEP12 Electricity Supply Industry - Generation Sector Training Package

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Modification History

Electricity Supply Industry - Generation Sector Industry Training Package (UEP12)

Version modification history

The version details of this endorsed Training Package are in the table below. The latest information is at the top of the table.

Version	Release Date	Authorisation	Comments
UEP12 Version 2.1	06 September 2013	ISC Upgrade	**The following qualifications were edited/updated:** UEP20112; UEP30112; UEP30212; UEP40112; UEP40212; UEP40312; UEP40412; UEP40512; UEP50112; UEP50312; UEP50412. **The following qualifications had metadata updated:** UEP40612; UEP50212

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			The following units were edited/amended: UEPOPS340B; UEPOPS357B; UEPOPS442B; UEPOPS501B; UEPOPS525B. **The following Skill Sets were added:** UEPSS00003 – High Voltage Operation – H.V. Switching; UEPSS00004 – High Voltage Operation – Development and co-ordination of H.V. switching programs
UEP12 Version 2		NSSC Endorsement	**New Qualification:** UEP40612 **New Units** UEPMNT201A; UEPMNT202A; UEPMNT369A; UEPMNT370A; UEPMNT371A; UEPMNT442A; UEPMNT443A; UEPMNT444A; UEPMNT445A; UEPMNT446A; UEPMNT447A; UEPMNT448A; UEPMNT449A; UEPMNT450A. **The following qualifications were edited/updated:** UEP20112; UEP30112; UEP30212; UEP40112; UEP40212; UEP40312; UEP40412; UEP50112; UEP50212; UEP50312; UEP50412. **The following imported unit was updated:** BSBWHS501A, CPCCCM2007B **The following imported unit was updated to the latest release:** LGAWORK404A **Editorial amendments:** **Updated unit title:** RIIMPO318B; TAEDEL301A. **Corrected unit code:** MEM05024B Perform welding

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			supervision.
UEP12 Version 1	26 June 2012		The following qualifications were added: UEP20112; UEP30112; UEP30212; UEP40112; UEP40212; UEP40312; UEP40412; UEP40512; UEP50112; UEP50212; UEP50312; UEP50412 The following qualifications were deleted: UEP30106; UEP30206; UEP40106; UEP40206; UEP40306; UEP40406; UEP40506; UEP50106; UEP50206; UEP50306; UEP50406 The following new units were added: UEPOPS251A; UEPOPS252A; UEPOPS358A; UEPOPS359A; UEPOPS360A; UEPOPS361A; UEPOPS362A; UEPOPS364A; UEPOPS368A; UEPOPS369A; UEPOPS370A; UEPOPS371A; UEPOPS443A; UEPOPS444A; UEPOPS445A; UEPOPS446A; UEPOPS447A; UEPOPS450A; UEPOPS451A; UEPOPS452A; UEPOPS454A; UEPOPS456A; UEPOPS457A; UEPOPS520A; UEPOPS523A; UEPOPS524A; UEPOPS525A; UEPOPS526A; UEPOPS527A; UEPOPS528A; UEPOPS529A; UEPMNT361A; UEPMNT362A; UEPMNT366A; UEPMNT367A; UEPMNT368A; UEPMNT434A; UEPMNT435A; UEPMNT436A; UEPMNT440A; UEPMNT441A; UEPOPL001A; UEPOPL002A The following units were removed: UEPOPS201A; UEPOPS208A; UEPOPS212A; UEPOPS213A; UEPOPS214A; UEPOPS215A; UEPOPS216A; UEPOPS217A; UEPOPS218A; UEPOPS219A; UEPOPS220A; UEPOPS221A; UEPOPS222A; UEPOPS223A;

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			UEPOPS224A; UEPOPS225A; UEPOPS226A; UEPOPS227A; UEPOPS228A; UEPOPS229A; UEPOPS230A; UEPOPS231A; UEPOPS233A; UEPOPS234A; UEPOPS235A; UEPOPS236A; UEPOPS239A; UEPOPS250A; UEPOPS302A; UEPOPS303A; UEPOPS341A; UEPOPS348A; UEPOPS350A; UEPOPS353A; UEPMNT301A; UEPMNT306A; UEPMNT316A; UEPMNT321A; UEPMNT322A; UEPMNT323A; UEPMNT324A; UEPMNT325A; UEPMNT326A; UEPMNT327A; UEPMNT328A; UEPMNT329A; UEPMNT330A; UEPMNT331A; UEPMNT332A; UEPMNT333A; UEPMNT334A; UEPMNT335A; UEPMNT336A; UEPMNT337A; UEPMNT338A; UEPMNT341A; UEPMNT342A; UEPMNT343A; UEPMNT344A; UEPMNT349A; UEPMNT353A; UEPMNT354A; UEPMNT360A; UEPOPS415A; UEPOPS401A; UEPOPS418A; UEPOPS421A; UEPOPS427A; UEPOPS429A; UEPOPS436A; UEPOPS438A; UEPMNT405A; UEPMNT409A; UEPMNT418A; UEPMNT420A; UEPMNT423A; UEPOPS503A; UEPOPS504A; UEPOPS506A The following units were amended including editorial changes (see below) UEPOPS202B; UEPOPS203B; UEPOPS204B; UEPOPS205B; UEPOPS206B; UEPOPS207B; UEPOPS209B; UEPOPS210B; UEPOPS211B; UEPOPS232B; UEPOPS237B; UEPOPS238B; UEPOPS240B; UEPOPS241B; UEPOPS242B; UEPOPS243B; UEPOPS244B; UEPOPS245B; UEPOPS246B; UEPOPS247B; UEPOPS248B; UEPOPS249B; UEPOPS301B; UEPOPS304B;

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			UEPOPS305B; UEPOPS306B; UEPOPS307B; UEPOPS308B; UEPOPS309B; UEPOPS310B; UEPOPS311B; UEPOPS312B; UEPOPS313B; UEPOPS314B; UEPOPS315B; UEPOPS316B; UEPOPS317B; UEPOPS318B; UEPOPS319B; UEPOPS320B; UEPOPS321B; UEPOPS322B; UEPOPS323B; UEPOPS324B; UEPOPS325B; UEPOPS326B; UEPOPS327B; UEPOPS328B; UEPOPS329B; UEPOPS330B; UEPOPS331B; UEPOPS332B; UEPOPS333B; UEPOPS334B; UEPOPS335B; UEPOPS336B; UEPOPS337B; UEPOPS338B; UEPOPS339B; UEPOPS340B; UEPOPS342B; UEPOPS343B; UEPOPS344B; UEPOPS345B; UEPOPS346B; UEPOPS347B; UEPOPS349B; UEPOPS351B; UEPOPS352B; UEPOPS354B; UEPOPS355B; UEPOPS356B; UEPOPS357B; UEPOPS402B; UEPOPS403B; UEPOPS404B; UEPOPS405B; UEPOPS406B; UEPOPS407B; UEPOPS408B; UEPOPS409B; UEPOPS410B; UEPOPS411B; UEPOPS412B; UEPOPS413B; UEPOPS414B; UEPOPS416B; UEPOPS417B; UEPOPS419B; UEPOPS420B; UEPOPS422B; UEPOPS423B; UEPOPS424B; UEPOPS425B; UEPOPS426B; UEPOPS428B; UEPOPS430B; UEPOPS431B; UEPOPS432B; UEPOPS433B; UEPOPS434B; UEPOPS435B; UEPOPS437B; UEPOPS439B; UEPOPS440B; UEPOPS441B; UEPOPS442B; UEPOPS501B; UEPOPS502B; UEPOPS505B; UEPOPS507B; UEPOPS508B; UEPOPS509B; UEPOPS510B; UEPOPS511B; UEPOPS512B; UEPOPS513B; UEPOPS514B; UEPOPS515B; UEPMNT302B;

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			UEPMNT303B; UEPMNT304B; UEPMNT305B; UEPMNT307B; UEPMNT308B; UEPMNT309B; UEPMNT310B; UEPMNT311B; UEPMNT312B; UEPMNT313B; UEPMNT314B; UEPMNT315B; UEPMNT317B; UEPMNT318B; UEPMNT319B; UEPMNT320B; UEPMNT339B; UEPMNT340B; UEPMNT345B; UEPMNT346B; UEPMNT347B; UEPMNT348B; UEPMNT350B; UEPMNT351B; UEPMNT352B; UEPMNT355B; UEPMNT356B; UEPMNT357B; UEPMNT358B; UEPMNT359B; UEPMNT401B; UEPMNT402B; UEPMNT403B; UEPMNT404B; UEPMNT406B; UEPMNT407B; UEPMNT408B; UEPMNT410B; UEPMNT411B; UEPMNT412B; UEPMNT413B; UEPMNT414B; UEPMNT415B; UEPMNT416B; UEPMNT417B; UEPMNT419B; UEPMNT421B; UEPMNT422B; UEPMNT424B; UEPMNT425B; UEPMNT426B; UEPMNT427B; UEPMNT428B; UEPMNT429B; UEPMNT430B; UEPMNT431B; UEPMNT432B; UEPMNT433B; UEPMNT501B; UEPMNT502B; UEPMNT503B; UEPMNT504B Relevant EKAS Clauses have been included in all Units as required for upload to Training.gov.au The following imported units were added to UEP12 Version 1: BSBFLM312C; BSBWOR402A; CPCCCM2007A; CPCCLDG3001A; CPCCLHS3001A; CPCCLHS3002A; CPCCLRG3001A; CPCCLRG3002A; CPCCLRG4001A; CPCCLSF2001A; CPCCLSF3001A; CPCCLSF4001A; LGAWORK404A; MEM05005B; MEM05011D; MEM05015D; MEM05016C; MEM05017D; MEM05018C; MEM05019D; MEM05020C; MEM05022C;

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			MEM05024B; MEM05025C; MEM05026C; MEM05036C; MEM05042B; MEM05043B; MEM05044B; MEM05045B; MEM05046B; MEM05047B; MEM05048B; MEM05049B; MEM05050B; MEM05051A; MEM05052A; MEM07006C; MEM07007C; MEM07008D; MEM07011B; MEM07012B; MEM07021B; MEM09002B; MEM09003B; MEM09004B; MEM09005B; MEM09006B; MEM12003B; MEM12007D; MEM12023A; MEM12024A; MEM18001C; MEM18002B; MEM18003C; MEM18006C; MEM18007B; MEM18009B; MEM18010C; MEM18018C; MEM18019B; MEM18020B; MEM18021B; MEM18022B; MEM18055B; NWP318A; NWP319A; NWP320B; RIIHAN309A; RIIMPO304B; RIIMPO308A; RIIMPO309A; RIIMPO318B; RIIMPO319A; TAEDEL301A; TLILIC0012A; TLILIC2005A; TLILIC3006A; UEENEEC001B; UEENEEC005B; UEENEEC010B; UEENEED101A; UEENEED104A; UEENEEE101A; UEENEEE102A; UEENEEE104A; UEENEEE105A; UEENEEE107A; UEENEEE117A; UEENEEE124A; UEENEEE137A; UEENEEF102A; UEENEEF105A; UEENEEG006A; UEENEEG033A; UEENEEG063A; UEENEEG101A; UEENEEG102A; UEENEEG106A; UEENEEG108A; UEENEEG109A; UEENEEI101A; UEENEEI107A; UEENEEI108A; The following imported units were removed from UEP12 Version 1: BSBADM304A; BSBADM305A; BSBCMN108A; BSBCMN203A; BSBCMN209A; BSBCMN213A; BSBCMN310A; BSBCMN311A;

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			BSBCMN404A; BSBCMN411A ; BSBFLM302A; BSBFLM304A; BSBFLM402A; BSBFLM404A; BSBFLM502A; BSBFLM504A; The following Imported Units have been updated to current versions: BSBCUS401B; BSBCUS501C; BSBFLM303C ; BSBFLM305C; BSBFLM306C; BSBFLM309C; BSBFLM311C; BSBINM401A; BSBINM501A; BSBINN301A; BSBINN502A; BSBLED401A; BSBLED501A; BSBMGT402A; BSBMGT403A; BSBMGT502B; BSBMGT515A; BSBMGT516C; BSBOHS509A; BSBWOR301A; BSBWOR401A; BSBWOR404B; BSBWOR501A; BSBWOR502B; TLILIC2001A; Editorial changes to Endorsed Units. Removal of spaces in any of the unit or qualification codes. Replace ‘Version No in all footers across the whole Training Package. For all Units: Change all Unit suffixes for version 1 units from ‘A’ to ‘B’ Add ‘1.1 Descriptor’ as a new title Move ‘3.1 License to practise’ to position 1.2 Move the sub-heading ‘2.1 Competencies’ from the left hand column to the right hand column Move the sub-heading ‘2.2 Literacy and Numeracy skills’ from the left hand column to the right hand column Include ‘3) Employability Skills’ and text therein as a whole new section Revise the numbering of all subsequent sections to accommodate the inclusion of the Employability Skills section at 3) Include "All knowledge and skills

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			detailed in this unit should be contextualised to current industry practices and technologies" as a new paragraph in ‘7) Required Skills and Knowledge’ Change all references to sections within a unit to reflect the correct section (may require change as a result of the inclusion of the Employability Skills section at 3). Completely remove the ‘Key Competencies’ and ‘Skills Enabling Employment’ sections.
UEP06 Version 1.1.	8/10/10	ISC Upgrade Authorised by NQC to meet Packaging Rule requirements and the inclusion of Sustainability Skills in qualifications.	Modification of the following qualifications to comply with NQC Packaging Rules. UEP20110 Certificate II in ESI Generation (Operations Support) Imported Units identified by industry added: MEM07005C Perform general machining MEM05012C Perform routine manual metal arc welding MEM05007C Perform manual heating and thermal cutting MEM05004C Perform routine oxy acetylene welding TLILIC108ALicence to operate a forklift truck
UEP06 Version 1	22 Nov 2006	NQC	Primary Release of Revised Training Package replacing UTP98

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Preliminary Information

Preliminary Information

The Electricity Supply Industry - Generation Sector

The Generation sector of the industry produces electricity for use in industry, business and private homes. The industry is supported primarily by large, state-owned or privatised power stations.

The Electricity Generation Sector encompasses all activities from the point of supply/acceptance of energy resources and consumables to the point of exit of electrical energy and by-products of the generation processes.

Within these boundaries it includes all operations, maintenance, systems support, scientific, engineering and design support, management, marketing and administration functions required to establish and meet business objectives.

The Generation Industry is primarily one of manufacturing and process control, insomuch as the Generation plant produces electricity and the plant operations are controlled through some form of computerised and communication technology systems where the operator need not necessarily interface with the technical functions of the plant. People working in the sector may be involved in a wide range of tasks, including the following:

- Operation of the plant from the control room
- Local operation of plant systems
- Management and coordination of unit or station operations
- Mechanical maintenance
- Electrical maintenance
- Electronic/Instrumentation maintenance
- Installation of new plant.

The Electricity Generation Sector rapidly diversifying and the sector has been characterised by a sustained period of privatisation of many State owned energy corporations and enterprises. Outsourcing of many functions and activities required for the production of electricity is prevalent. As a consequence of this restructuring, employment in the industry has been significantly reduced and the shift to contractors has seen organisations utilise the skills of tradespersons from industry sectors other than Generation to meet construction and maintenance requirements.

Even though the industry has undergone rapid and significant changes in work methods, staffing levels, management approaches and the sub-contracting of many work functions to external contractors, it still maintains a strong commitment to training and safety and it is now embracing the spirit of the National Training Reform Agenda.

The main activities of the industry are the operation and maintenance, diagnosis and repair of electricity production plant and equipment in relation to:

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- large coal or gas fired steam generation plant
- smaller gas fired steam turbine cogeneration plant
- diesel fired internal combustion engine driven generation plant
- hydro generation plant
- wind driven generation plant.
- emerging renewable energy technologies

Industry coverage

The formal industry coverage for the Electricity Supply Industry is under ANZSIC Code 3610 in which the sector is defined as consisting of plant and equipment mainly engaged in the generation, transmission or distribution of electricity.

Generation encompasses all activities from the point of supply/acceptance of energy resources and consumables to the point of exit of electrical energy and by-products of the generation processes. Within these boundaries it includes all operations, maintenance, systems support, scientific, engineering and design support, management, marketing and administration functions required to establish and meet business objectives.

Technological innovation and the range of work activities within the vocations involved in Electricity Supply Industry – Generation Sector systems provide excellent career opportunities. There are three specific areas that provide individuals with the opportunity to enter a career in the Generation sector and gain nationally recognized qualifications.

Operations

'Operations' is a generic term used to describe employees who undertaking a wide range of functions within an electricity generation power station. Those who work in Operations ensure the electricity generation plant is functioning to optimum capacity. Individuals may be specific plant operators or multi-purpose operators. Operators also undertake some maintenance functions within the power station.

System Operations

System Operations refers to those occupations that control the production of electricity to meet consumer demand. They require the individual to have an excellent understanding of the operations and technical capabilities of the generation plant.

Maintenance

Entry to a maintenance career path within the Generation Sector will require the individual to have completed a recognised trade qualification through the Electrotechnology or Metals and Engineering Training Packages or equivalent before embarking on further training in the maintenance requirements of electricity generation plant and equipment.

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Regulatory arrangements

The Industry is subject to a high level of legislation, regulation, Codes of Practice, guidelines and advisory standards related to the research, assembly, installation, construction, diagnostics, maintenance, commission, operate, program, test or repair of; steam generation systems, plant and equipment; networks; systems; circuits; equipment; components; appliances; facilities and the like in the field of electricity. The regulatory requirements are typically based on the principle of public safety and the safety and health of individuals who work on electricity generation plant, equipment and systems. Operation of plant and equipment, apparatus and systems, may have other regulatory codes and practices related to boilers, mobile plant and equipment, liquids, electrical wiring systems and associated circuits covering the industrial environment in which they operate.

Where possible, relevant and current regulatory requirements have been incorporated into this Training Package to assure outcomes are complementary to regulation. Where regulatory requirements are amended or introduced such outcomes are to be incorporated in training and assessment delivery. Continuous improvement and maintenance arrangements included in this Training Package will endeavour to maintain pace with changes.

Statutes, regulations and codes of practice

Federal, State and Territory Gas, Electricity, Telecommunications, Anti discrimination, Occupational Health and Safety and Work Cover Acts and Regulations typically cover the Industry. Additionally, there are many Australian/New Zealand and International Standards, codes of practices and regulations that apply and to which observance is essential for assuring life, property and commerce. Thus, relevant legislative, regulatory codes of practice, guidelines and advisory standard requirements form an integral part of the obligatory requirements in the vocational standards found in this Training Package.

Other Industry Standards

It is recognised that the ESI - Generation Industry Standards do not cover all the competencies which are likely to be required and applied within ESI - Generation Industry workplaces. Nationally endorsed competency standards from other industries will be used where appropriate and the concept of cross-industry disciplinary standards will be encouraged. Specific rules have been included within this Training Package to address these arrangements.

Overview

What is a Training Package?

A Training Package is an integrated set of nationally endorsed competency standards, assessment guidelines and Australian Qualifications Framework (AQF) qualifications for a specific industry, industry sector or enterprise.

Each Training Package:

- provides a consistent and reliable set of components for training, recognising and assessing peoples skills, and may also have optional support materials

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- enables nationally recognised qualifications to be awarded through direct assessment of workplace competencies
- encourages the development and delivery of flexible training which suits individual and industry requirements
- encourages learning and assessment in a work-related environment which leads to verifiable workplace outcomes.

How do Training Packages fit within the National Skills Framework?

The National Skills Framework applies nationally, is endorsed by the Ministerial Council for Vocational and Technical Education, and comprises the Australian Quality Training Framework 2010 (AQTF 2010), and Training Packages endorsed by the National Quality Council (NQC).

How are Training Packages developed?

Training Packages are developed by Industry Skills Councils or enterprises to meet the identified training needs of specific industries or industry sectors. To gain national endorsement of Training Packages, developers must provide evidence of extensive research, consultation and support within the industry area or enterprise.

How do Training Packages encourage flexibility?

Training Packages describe the skills and knowledge needed to perform effectively in the workplace without prescribing how people should be trained.

Training Packages acknowledge that people can achieve vocational competency in many ways by emphasising what the learner can do, not how or where they learned to do it. For example, some experienced workers might be able to demonstrate competency against the units of competency, and even gain a qualification, without completing a formal training program.

With Training Packages, assessment and training may be conducted at the workplace, off-the-job, at a training organisation, during regular work, or through work experience, work placement, work simulation or any combination of these.

Who can deliver and assess using Training Packages?

Training and assessment using Training Packages must be conducted by a Registered Training Organisation (RTO) that has the qualifications or specific units of competency on its scope of registration, or that works in partnership with another RTO, as specified in the AQTF 2010.

Training Package Components

Training Packages are made up of mandatory components endorsed by the NQC, and optional support materials.

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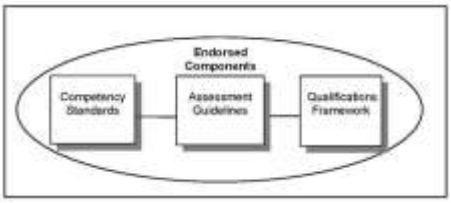
Training Package Endorsed Components

The nationally endorsed components include the Competency Standards, Assessment Guidelines and Qualifications Framework. These form the basis of training and assessment in the Training Package and, as such, they must be used.



Competency Standards

Each unit of competency identifies a discrete workplace requirement and includes the knowledge and skills that underpin competency as well as language, literacy and numeracy; and occupational health and safety requirements. The units of competency must be adhered to in training and assessment to ensure consistency of outcomes.

Assessment Guidelines

The Assessment Guidelines provide an industry framework to ensure all assessments meet industry needs and nationally agreed standards as expressed in the Training Package and the AQTF 2010. The Assessment Guidelines must be followed to ensure the integrity of assessment leading to nationally recognised qualifications.

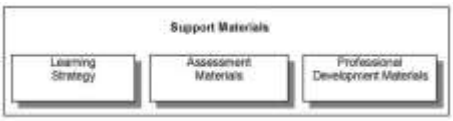
Qualifications Framework

Each Training Package provides details of those units of competency that must be achieved to award AQF qualifications. The rules around which units of competency can be combined to make up a valid AQF qualification in the Training Package are referred to as the ‘packaging rules’. The packaging rules must be followed to ensure the integrity of nationally recognised qualifications issued.

Training Package Support Materials

The endorsed components of Training Packages are complemented and supported by optional support materials that provide for choice in the design of training and assessment to meet the needs of industry and learners.

Training Package support materials can relate to single or multiple units of competency, an industry sector, a qualification or the whole Training Package. They tend to fall into one or more of the categories illustrated below.



Training Package support materials are produced by a range of stakeholders such as RTOs, individual trainers and assessors, private and commercial developers and Government agencies.

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Training Package, Qualification and Unit of Competency Codes

There are agreed conventions for the national codes used for Training Packages and their components. Always use the correct codes, exactly as they appear in the Training Package, **and with the code always before the title**.

Training Package Codes

Each Training Package has a unique five-character national code assigned when the Training Package is endorsed, for example XYZ08. The first three characters are letters identifying the Training Package industry coverage and the last two characters are numbers identifying the year of endorsement.

Qualification Codes

Within each Training Package, each qualification has a unique eight-character code, for example XYZ10108. Qualification codes are developed as follows:

- the first three letters identify the Training Package;
- the first number identifies the qualification level (noting that, in the qualification titles themselves, arabic numbers are **not** used);
- the next two numbers identify the position in the sequence of the qualification at that level; and
- the last two numbers identify the year in which the qualification was endorsed. (Where qualifications are added after the initial Training Package endorsement, the last two numbers may differ from other Training Package qualifications as they identify the year in which those particular qualifications were endorsed.)

Unit of Competency Codes

Within each Training Package, each unit of competency has a unique code. Unit of competency codes are assigned when the Training Package is endorsed, or when new units of competency are added to an existing endorsed Training Package. Unit codes are developed as follows:

- a typical code is made up of 12 characters, normally a mixture of uppercase letters and numbers, as in UEPOPS232B
- the first three characters signify the Training Package – UEPOPS232B Transport plant and equipment – in the above example and up to eight characters, relating to an industry sector, function or skill area, follow;
- the last character is always a letter and identifies the unit of competency version. An ‘A’ at the end of the code indicates that this is the original unit of competency. ‘B’, or another incremented version identifier means that minor changes have been made. Typically this would mean that wording has changed in the range statement or evidence guide, providing clearer intent; and
- where changes are made that alter the outcome, a new code is assigned and the title is changed.

Training Package, Qualification and Unit of Competency Titles

There are agreed conventions for titling Training Packages and their components. Always use the correct titles, exactly as they appear in the Training Package, and with the code always placed before the title.

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Training Package Titles

The title of each endorsed Training Package is unique and relates the Training Packages broad industry coverage.

Qualification Titles

The title of each endorsed Training Package qualification is unique. Qualification titles use the following sequence:

- first, the qualification is identified as either Certificate I, Certificate II, Certificate III, Certificate IV, Diploma, Advanced Diploma, Vocational Graduate Certificate, or Vocational Graduate Diploma;
- this is followed by the words ‘in’ for Certificates I to IV, and ‘of’ for Diploma, Advanced Diploma, Vocational Graduate Certificate and Vocational Graduate Diploma;
- then, the industry descriptor, for example Telecommunications; and
- then, if applicable, the occupational or functional stream in brackets, for example (Computer Systems).

For example:UEP20112 Certificate II in ESI Generation (Operations Support)

Unit of Competency Titles

Each unit of competency title is unique. Unit of competency titles describe the competency outcome concisely, and are written in sentence case.

For example:UEPOPS232B Transport plant and equipment

Introduction to the UEP12 Electricity Supply Industry - Generation Sector Training Package

See 'The Electricity Supply Industry - Generation Sector Training Package' section

The Electricity Supply Industry - Generation Sector Training Package

The Electricity Supply Industry - Generation Sector Training Package

The Training Package for the Electricity Supply Industry – Generation Sector Industry (UEP12) has been developed on behalf of the EnergyUtilities Industry and community stakeholders from all States/Territories of Australia by EE-Oz Training Standards, with the support of the Department of Innovation, Industry, Science and Research and Tertiary Education (DIISRTE). EE-Oz Training Standards operates under a charter from DIISRTE as the declared National Industry Skills Council for the ElectroComms and EnergyUtilities Industry. EnergyUtilities, Industry practitioners, regulators, government agencies and community stakeholders contributed much effort, support and knowledge in its development.

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The first Training Package for this industry was released in 1998, as the Training Package for the Generation Industry (UTP98). At that time it broke new ground for setting nationally recognised qualifications comprised of Competency Standard Units as they related to work performance. It assisted in benchmarking the design of training and assessment processes and practices. Since its initial release, it has undergone one version change. The change incorporated the Advanced Diploma qualification as well as other minor amendments.

In its revised form, the ESI – Generation Sector Training Package has gone even further in improving currency, flexibility and relevance to industry by enhancing the range of qualifications and Competency Standard Units available. It includes an array of new and revised Competency Standard Units, pathways and design features. The previous Units have been revamped, reorganised and updated to include 225 current Generation Industry Competency Standards Units, across AQF four levels. The result is a Training Package that is more relevant to the industry and that readily responds to the needs and responsibilities of the future, both in technology and work organisation.

New skilled career pathways have also been developed that suit employment-based new entrants, as well as the existing workforce or those with pre-existing skill sets.

The Training Package can to be used by all those involved in the delivery and assessment of competencies that cover Generation Operations; Maintenance; Wind Generator Plants; Control Centres; Solar Generator Plants; SCADA and Systems Operations.

Users of this Industry Training Package include:

- large multi-energy utilities companies
- State Training and Recognition Authorities which will use the Training Package as the pre-eminent industry's advice to government; and as a statement of the minimum requirements to be satisfied by Registered Training Organisations in the delivery of services.
- State/Territory Industry Training Bodies/Industry Skills Councils which will use the Training Package to underpin their relationship with, and support for, the State training and recognition authorities quality systems, including providing advice
- Registered Training Organisations which will issue qualifications and or statements of attainment, based on the requirements outlined in the Training Package which contains the vocational standards for industry
- Individual candidates/trainees/learners who will use the provisions of the Training Package to establish their responsibilities and to protect their prerogatives
- Organisations in mapping their human resource processes and arrangements to the National benchmark Competency Standard Units in this Training Package.

Summary of AQF qualifications in the UEP12 Version 1 Training Package

Table 1 AQF qualifications in this Training Package

AQF	Qualification Code	Qualification Title
2	UEP20112	Certificate II in ESI Generation (Operations Support)
3	UEP30112	Certificate III in ESI Generation (Systems Operations)

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AQF	Qualification Code	Qualification Title
3	UEP30212	Certificate III in ESI Generation (Operations)
4	UEP40112	Certificate IV in ESI Generation (Systems Operations)
4	UEP40212	Certificate IV in ESI Generation (Operations)
4	UEP40312	Certificate IV in ESI Generation Maintenance (Mechanical)
4	UEP40412	Certificate IV in ESI Generation Maintenance (Fabrication)
4	UEP40512	Certificate IV in ESI Generation Maintenance (Electrical/Electronic)
4	UEP40612	Certificate IV inLarge Scale Wind Generation - Electrical
5	UEP50112	Diploma of ESI Generation (Systems Operations)
5	UEP50212	Diploma of ESI Generation (Operations)
5	UEP50312	Diploma of ESI Generation (Maintenance)
5	UEP50412	Diploma of ESI Generation (Electrical/Electronic)

Table 2 — Qualifications Mapping of this Training Package UEP12 -Version 2 to the former Training Package UEP12 -Version 1

AQF Code	Certificate IV Qualifications (UEP12 V2)	Certificate IV Qualifications (UEP12 – V1)	E = Equivalent N = Not Equivalent
UEP40512	Certificate IV inLarge Scale Wind Generation - Electrical	New Qualification	N

Table 3 — Qualifications Mapping of this Training Package UEP12 -Version 1 to the former Training Package UEP06-Version 1.1

AQF Code	Certificate II Qualifications (UEP12 V1)	Certificate II Qualifications (UEP06 – V1.1)	E = Equivalent N = Not Equivalent
UEP20112	CII in ESI Generation (Operations Support)	UEP20110 CII in ESI Generation (Operations Support)	E

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AQF Code	Certificate III Qualifications (UEP12 V1)	Certificate III Qualifications (UEP06 – V1.1)	E = Equivalent N = Not Equivalent
	Deleted	UEP30106 CIII in ESI Generation (Systems Operations)	N
	Deleted	UEP30206 CIII in ESI Generation (Operations)	N
UEP30112	CIII in ESI Generation (Systems Operations)	New Qualification	N
UEP30212	CIII in ESI Generation (Operations)	New Qualification	N

AQF Code	Certificate IV Qualifications (UEP12 V1)	Certificate IV Qualifications (UEP06 – V1.1)	E = Equivalent N = Not Equivalent
	Deleted	UEP40106 CIV in ESI Generation (Systems Operations)	N
	Deleted	UEP40206 CIV in ESI Generation (Operations)	N
	Deleted	UEP40306 CIV in ESI Generation Maintenance (Mechanical)	N
	Deleted	UEP40406 CIV in ESI Generation Maintenance (Fabrication)	N
	Deleted	UEP40506 CIV in ESI Generation Maintenance (Electrical/Electronics)	N
UEP40112	CIV in ESI Generation (Systems Operations)	New Qualification	N
UEP40212	CIV in ESI Generation (Operations)	New Qualification	N
UEP40312	CIV in ESI Generation Maintenance (Mechanical)	New Qualification	N
UEP40412	CIV in ESI Generation Maintenance (Fabrication)	New Qualification	N
UEP40512	CIV in ESI Generation Maintenance (Electrical/Electronics)	New Qualification	N

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AQF Code	Diploma Qualifications (UEP12 V1)	Diploma Qualifications (UEP06 – V1.1)	E = Equivalent N = Not Equivalent
	Deleted	UEP50106 Diploma of ESI Generation (Systems Operations)	N
	Deleted	UEP50206 Diploma of ESI Generation (Operations)	N
	Deleted	UEP50306 Diploma of ESI Generation (Maintenance)	N
	Deleted	UEP50406 Diploma of ESI Generation Electrical/Electronic)	N
UEP50112	Diploma of ESI Generation (Systems Operations)	New Qualification	N
UEP50212	Diploma of ESI Generation (Operations)	New Qualification	N
UEP50312	Diploma of ESI Generation (Maintenance)	New Qualification	N
UEP50412	Diploma of ESI Generation Electrical/Electronic)	New Qualification	N

Table 4 — Qualifications Mapping of UEP06 Version 1.1 to the previous Version UEP06 version 1

Detailed below is a summary qualifications mapping of the former ESI - Generation Industry Training Package (UTG98) to the new ESI - Generation Sector Training Package. Note only Qualifications which have been revised are included.

UEP06 Version 1.1 Qualifications	Nature of Relationship to UEP06 Version 1.0	Equivalent -full, part, or no
UEP20110 Certificate II in ESI Generation (Operations Support)	Update on the previous UEP20106 Certificate II in ESI Generation (Operations Support) New structure to comply with NQC Policy	E

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Table 5 - Detailed below is a summary qualifications mapping of the former ESI - Generation Industry Training Package UTP98 and UEP06 -Version 1 to this ESI - Generation Sector Training Package.

UEP06 Qualifications	Nature of Relationship to UTP98	Equivalent -full, part, or no
UEP20106 Certificate II in ESI Generation (Operations Support)	Update on the previous Certificate II in ESI – Generation (Operations) UTP20198 New structure and a range of new units of competency available.	None
UEP30106 Certificate III in ESI Generation (Systems Operations)	New Qualification New structure and a range of new units of competency available.	None
UEP30206 Certificate III in ESI Generation (Operations)	Update on the previous Certificate III in ESI – Generation UTP30298 New structure and a range of new units of competency available.	None
UEP40106 Certificate IV in ESI Generation (Systems Operations)	Update on the previous Certificate IV in ESI – Generation (System Operations) UTP40398 New structure and a range of new units of competency available.	None
UEP40206 Certificate IV in ESI Generation (Operations)	Update on the previous Certificate IV in ESI – Generation (Operations) UTP40298 New structure and a range of new units of competency available.	None
UEP40306 Certificate IV in ESI Generation Maintenance (Mechanical)	Update on the previous Certificate IV in ESI – Generation (Mechanical) UTP40398 New structure and a range of new units of competency available.	None
UEP40406 Certificate IV in ESI Generation Maintenance (Fabrication)	New Qualification New structure and a range of new units of competency available.	None
UEP40506 Certificate IV in ESI Generation Maintenance (Electrical/Electronic)	Update on the previous Certificate IV in ESI – Generation (Electrical/Electronic) UTP40198 New structure and a range of new units of competency available.	None
UEP50106	New Qualification	None

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UEP06 Qualifications	Nature of Relationship to UTP98	Equivalent -full, part, or no
Diploma of ESI Generation (Systems Operations)	New structure and a range of new units of competency available.	
UEP50206 Diploma of ESI Generation (Operations)	Update on the previous Diploma of ESI – Generation (Operations) UTP50298 New structure and a range of new units of competency available.	None
UEP50306 Diploma of ESI Generation (Maintenance)	New Qualification New structure and a range of new units of competency available.	None
UEP50406 Diploma of ESI Generation (Electrical/Electronic)	Update on the previous Diploma of ESI – Generation (Electrical/Electronic) UTP50198 New structure and a range of new units of competency available.	None

Summary of Units of Competency in the UEP12 Version 1 Training Package

Table 6 – UEP12 ESI - Generation Sector Training Package - Competency Standard Units

UNIT DISCIPLINE	UNIT CODE	No. of CSUs
Power Generation Operations AQF 2	OPS2	24
Power Generation Operations AQF 3	OPS3	61
Power Generation Operations AQF 4	OPS4	45
Power Generation Operations AQF 5	OPS5	20
Power Generation Maintenance AQF 2	MNT2	2
Power Generation Maintenance AQF 3	MNT3	39
Power Generation Maintenance AQF 4	MNT4	42
Power Generation Maintenance AQF 5	MNT5	4
High Risk Licensing Units	OPL	2
Total CSUs		239

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Full details of the Competency Standards Units in this Training Package including: Unit Code, Title, Weighting Points, AQF Level, Pre-requisites and Qualification Mapping, are contained in the Index of Competency Standard Units, in Part 1.2.09 Competency Standards Index of this Training Package.

A mapping Competency Standard Units including the relationship between units which have been amended, added or deleted from versions of Generation Sector Training Package and equivalences is included in Part 1.2.10 Competency Standards Index of this Training Package.

Table 7 - Imported Units of Competency in the UEP12 Training Package Version 1

Training Package	Training Package Title	Version	No. of Units
BSB07	Business Services Training Package	5	26
CPC08	Construction, Plumbing and Services Training Package	6.1	10
LGA04	Local Government Training Package	2.2	1
MEM05	Metal and Engineering Training Package	4	56
NWP07	Water Training Package	2	3
RII09	Resources and Infrastructure Industry Training Package	2	6
TAE10	Training and Education Training Package	1	1
TLI10	Transport and Logistics Training Package	1.1	4
UET12	ESI- Transmission Distribution and Rail	2	2
UEE11	Electrotechnology Training Package	1	48
Total Imported CSUs			**157**

Full details of the Imported Units in this Training Package including: Unit Code, Title, Weighting Points, AQF Level, Pre-requisites and Qualification Mapping, are contained in the Index of Competency Standard Units in Part 1.2.09 Competency Standards Index of this Training Package.

Please consult the source Training Package for information, including equivalences, in relation to new and updated imported units included in this version of the Generation Sector Training Package.

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Language, Literacy, Numeracy

The Competency Standards have been written to reflect the technical and operational needs of industry and include appropriate language and literacy requirements. A new and specific section related to literacy and numeracy skills has been included in the Competency Standard Units for the purposes of providing advice to RTOs on the entry requirements for each unit. It characterises how participants are to be best equipped to achieve the required, writing and numeracy skill levels.

A specific section for Literacy and Numeracy Skills and Employability Skills has been included in Part 2.3.1 of this Training Package. In addition, there is an explanation of their relationship to the Performance Criteria and their assessment in accordance with the critical aspects of evidence within each Competency Standard Unit.

Access, Equity and Cultural Diversity

The skills required of employees in the ESI - Generation Industry sector of the EnergyUtilities Industry are comprehensive, with many employment opportunities available. The Competency Standards reflect the range of knowledge and skills and their application, required in the Industry. They are written in a non-exclusive manner so as to increase the participation rates of under-represented community groups and to minimise unintentional bias.

As a matter of policy in the ESI - Generation Industry and in this Training Package there is no exclusion of any persons from participating in competency development, training and employment. This includes encouraging under-represented groups such as indigenous peoples, people with disabilities, women, and people from rural and remote areas or cultural diversity to join the Industry.

Acknowledgments

The Board of Directors of the ElectroComms and Energy Utilities Industry Skills Council Ltd trading as EE-Oz Training Standards wishes to acknowledge the important developmental roles played by training advisory and delivery organisations, enterprises, employer and employee representatives, industry practitioners, regulatory authorities, individuals and community stakeholders. Without their level of commitment and support this Training Package would not exist in its current form. The Board acknowledges and thanks the following organisations and individuals:

- ESI - Generation Sector Training Package Training Advisory Group
- ESI - Generation Sector Training Package Review Technical Advisory Committees
- the Chairs, Executive Officers, and Members of the EE-Oz Training Standards State and Territory Network (ITABs) and their various sub-committees
- the State and Territory Training Authorities
- the State and Territory Regulatory Authorities
- industry sector RTOs and practitioners for contributing to and being supportive of the project
- industry sector practitioners for contributing to and being supportive of the project.
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Outline of this Training Package

Outline of this Training Package

The endorsed components of the Training Package are contained in two volumes. Volume 1 covers the overall Package framework and completion requirements for qualifications, and Volume 2 the content details for respective parts and sub-sections of Volume 1. Both volumes form an integrated whole and are not to be used independently of each other.

Volume 1: Structure and Overview

Qualification Framework

This section describes how the qualifications, scope/descriptions, composition and content are structured. Completion and issuance requirements are provided as well as advice on flexibility arrangements, with entry and exit pathways and articulation arrangements. Titles and codes of the list of qualifications to be issued are also included.

Competency Standards

This section describes how the competency standards were developed (in broad terms), the industry coverage they apply to, as well as the format and construction of the individual Competency Standard Units. The index of Competency Standard Units and their scope/description is included in this part. Matters related to language, literacy and numeracy, access, equity and cultural diversity and regulatory arrangements, for which the Competency Standard Units may apply, is also included. The Definitions/Glossary and Essential Knowledge and Associated Skills sections of the Training Package link directly to the Competency Standard Units and no Unit is to be used in isolation or exported without these interrelated components.

Part 3 – Assessment Guidelines

This section outlines how the assessment guidelines inform a Registered Training Organisation (RTO) on the infrastructure requirements they will need to enable them to carry out training delivery assessment activities related to the Training Package. The guidelines include assessment systems, the role of RTOs, assessment pathways, recognition arrangements, assessor qualifications and sources of information.

Volume 2: Competency Standard Units — Content and scope

Volume 2 contains the Competency Standard Units in their respective disciplines.

Volume 2 also contains the Essential Knowledge and Associated Skills, a Matrix mapping the essential knowledge and associated skills (EKAS) to the Unit and to the Definitions/Glossary section, which provides a description of relevant terms and vocabulary that appear in this Package. Also included are definitions relating to literacy and numeracy skills.

Note: The two volumes form an integrated whole and must not be used independently of each other.

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Electricity Supply Industry – Generation Sector Training Package Layout

The revised Electricity Supply Industry – Generation Sector Training Package has been developed, reviewed and validated through extensive industry consultation. It reflects the views of a wide cross-section of the industry and its key stakeholders/practitioners throughout Australia.

The Training Package has been constructed as a two volume set. Volume 1 covers the overall package framework and completion requirements for qualifications. Volume 2 includes the content details of parts and sub-sections of Volume 1. The two volumes form an integrated whole and are not to be used independently of each other.

Volume 1

Preliminary Information

The Generation Industry

Overview of Training Packages

ESI – Generation Sector Training Package

Part 1 Qualifications Framework

Part 2 Competency Standards Overview and Index

Part 3 Assessment Guidelines

Appendix A — New Apprenticeships

Appendix B — Sample Assessment Instruments

Enclosures:

- Enclosure A: List of Sample Assessment Instruments
- Enclosure B: Administrative Forms
- Enclosure C: Glossary of Terms

Volume 2

Preliminary Information

Part 1 Definitions/Glossary

Part 2 Competency Standards

2.1 Competency Standard Units

2.1.1 Operations Units UEPOPS202B – UEPOPS252A

2.1.2 Operations Units UEPOPS301B – UEPOPS371A

2.1.3 Maintenance Units UEPMNT302B – UEPMNT368A

2.1.4 Operations Units UEPOPS402B – UEPOPS457A

2.1.5 Maintenance Units UEPMNT401B – UEPMNT441A

2.1.6 Operations Units UEPOPS501B – UEPOPS529A

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2.1.7 Maintenance Units UEPMNT501B – UEPMNT504B

2.1.8 Imported Units

2.2 Essential Knowledge and Associated Skills

Part 3 Language, Literacy and Numeracy

Important Note to Users

Training Packages are not static documents. They are amended periodically to reflect the latest industry practices and are version controlled. It is essential that the latest version is always used.

Check the version number before commencing training or assessment

This Training Package is Version 1 – check whether this is the latest version by going to the Training Information Service (www.training.gov.au) and locating information about the Training Package. Alternatively, contact the Training Package developer and technical content custodian ElectroComms and EnergyUtilities Industry Skills Council Ltd, trading as EE-Oz Training Standards http://www.eeoz.com.au/ to obtain relevant content advice and confirm the latest version number.

Explanation of version number conventions

The primary release Training Package is Version 1. When changes are made to a Training Package, sometimes the version number is changed and sometimes it is not, depending on the extent of the change. When a Training Package is reviewed, it is considered to be a new Training Package for the purposes of version control and is Version 1. Do not confuse the version number with the Training Package's national code (which remains the same during its period of endorsement).

Explanation of the review date

The review date (shown on the title page and in the footer of each page) indicates when the Training Package is expected to be reviewed to meet changes in technology and other circumstances. The review date is not an expiry date. Endorsed Training Packages and their components remain current until they are reviewed or replaced.

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1.0.00 Qualification Framework

Volume 1 Part 1

Qualification Framework

1.1.00 The Australian Qualification Framework

1.0 The Australian Qualification Framework

What is the Australian Qualifications Framework?

A brief overview of the Australian Qualifications Framework (AQF) follows. For a full explanation of the AQF, see the AQF Implementation Handbook.
http://www.aqf.edu.au/Portals/0/Documents/Handbook/AQF_Handbook_07.pdf
The AQF provides a comprehensive, nationally consistent framework for all qualifications in post-compulsory education and training in Australia. In the vocational education and training (VET) sector it assists national consistency for all trainees, learners, employers and providers by enabling national recognition of qualifications and Statements of Attainment.
Training Package qualifications in the VET sector must comply with the titles and guidelines of the AQF. Endorsed Training Packages provide a unique title for each AQF qualification which must always be reproduced accurately.

Qualifications

Training Packages can incorporate the following eight AQF qualifications:

- Certificate I in ...
- Certificate II in ...
- Certificate III in ...
- Certificate IV in ...
- Diploma of ...
- Advanced Diploma of ...
- Vocational Graduate Certificate of ...
- Vocational Graduate Diploma of ...

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On completion of the requirements defined in the Training Package, a Registered Training Organisation (RTO) may issue a nationally recognised AQF qualification. Issuance of AQF qualifications must comply with the advice provided in the AQF Implementation Handbook, the AQTF 2010 Essential Standards for Initial and Continuing Registration and VET Quality Framework (Standards and Requirements)".

Statement of Attainment

A Statement of Attainment is issued by a Registered Training Organisation when an individual has completed one or more units of competency from nationally recognised qualification(s)/courses(s). Issuance of Statements of Attainment must comply with the advice provided in the current AQF Implementation Handbook the AQTF 2010 Essential Standards for Initial and Continuing Registration and VET Quality Framework (Standards and Requirements)".
Under the AQTF 2010 and VET Quality Framework (Standards and Requirements)", RTOs must recognise the achievement of competencies as recorded on a qualification or Statement of Attainment issued by other RTOs. Given this, recognised competencies can progressively build towards a full AQF qualification.

AQF Guidelines and Learning Outcomes

The AQF Implementation Handbook provides a comprehensive guideline for each AQF qualification. A summary of the learning outcome characteristics and their distinguishing features for each VET related AQF qualification is provided below.

Certificate II

Characteristics of Learning Outcomes

Breadth, depth and complexity of knowledge and skills would prepare a person to perform in a range of varied activities or knowledge application where there is a clearly defined range of contexts in which the choice of actions required is usually clear and there is limited complexity in the range of operations to be applied.
Performance of a prescribed range of functions involving known routines and procedures and some accountability for the quality of outcomes.
Applications may include some complex or non-routine activities involving individual responsibility or autonomy and/or collaboration with others as part of a group or team.

Distinguishing Features of Learning Outcomes

Do the competencies enable an individual with this qualification to:

- demonstrate basic operational knowledge in a moderate range of areas;
- apply a defined range of skills;
- apply known solutions to a limited range of predictable problems;
- perform a range of tasks where choice between a limited range of options is required;

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- assess and record information from varied sources;
- take limited responsibility for own outputs in work and learning

Certificate III

Characteristics of Learning Outcomes

Breadth, depth and complexity of knowledge and competencies would cover selecting, adapting and transferring skills and knowledge to Australian environments and providing technical advice and some leadership in resolution of specified problems. This would be applied across a range of roles in a variety of contexts with some complexity in the extent and choice of options available.
Performance of a defined range of skilled operations, usually within a range of broader related activities involving known routines, methods and procedures, where some discretion and judgement is required in the section of equipment, services or contingency measures and within known time constraints.
Applications may involve some responsibility for others.
Participation in teams including group or team coordination may be involved.

Distinguishing Features of Learning Outcomes

Do the competencies enable an individual with this qualification to:

- demonstrate some relevant theoretical knowledge
- apply a range of well-developed skills
- apply known solutions to a variety of predictable problems
- perform processes that require a range of well-developed skills where some discretion and judgement is required
- interpret available information, using discretion and judgement
- take responsibility for own outputs in work and learning
- take limited responsibility for the output of others

Certificate IV

Characteristics of Learning Outcomes

Breadth, depth and complexity of knowledge and competencies would cover a broad range of varied activities or application in a wider variety of contexts most of which are complex and non-routine.
Leadership and guidance are involved when organising activities of self and others as well as contributing to technical solutions of a non-routine or contingency nature.
Performance of a broad range of skilled applications including the requirement to evaluate and analyse current practices, develop Australian criteria and procedures for performing current practices and provision of some leadership and guidance to others

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in the application and planning of the skills.
Applications involve responsibility for, and limited organisation of, others.

Distinguishing Features of Learning Outcomes

Do the competencies enable an individual with this qualification to:

- demonstrate understanding of a broad knowledge base incorporating some theoretical concepts
- apply solutions to a defined range of unpredictable problems
- identify and apply skill and knowledge areas to a wide variety of contexts, with depth in some areas
- identify, analyse and evaluate information from a variety of sources
- take responsibility for own outputs in relation to specified quality standards
- take limited responsibility for the quantity and quality of the output of others

Diploma

Characteristics of Learning Outcomes

Breadth, depth and complexity covering planning and initiation of alternative approaches to skills or knowledge applications across a broad range of technical and/or management requirements, evaluation and coordination.
The self directed application of knowledge and skills, with substantial depth in some areas where judgement is required in planning and selecting appropriate equipment, services and techniques for self and others.
Applications involve participation in development of strategic initiatives as well as personal responsibility and autonomy in performing complex technical operations or organising others. It may include participation in teams including teams concerned with planning and evaluation functions. Group or team coordination may be involved.
The degree of emphasis on breadth as against depth of knowledge and skills may vary between qualifications granted at this level.

Distinguishing Features of Learning Outcomes

Do the competencies or learning outcomes enable an individual with this qualification to:

- demonstrate understanding of a broad knowledge base incorporating theoretical concepts, with substantial depth in some areas
- analyse and plan approaches to technical problems or management requirements
- transfer and apply theoretical concepts and/or technical or creative skills to a range of situations
- evaluate information, using it to forecast for planning or research purposes
- take responsibility for own outputs in relation to broad quantity and quality

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parameters
- take some responsibility for the achievement of group outcomes

Advanced Diploma

Characteristics of Learning Outcomes

Breadth, depth and complexity involving analysis, design, planning, execution and evaluation across a range of technical and/or management functions including development of Australian criteria or applications or knowledge or procedures.
The application of a significant range of fundamental principles and complex techniques across a wide and often unpredictable variety of contexts in relation to either varied or highly specific functions. Contribution to the development of a broad plan, budget or strategy is involved and accountability and responsibility for self and others in achieving the outcomes is involved.
Applications involve significant judgement in planning, design, technical or leadership/guidance functions related to products, services, operations or procedures.
The degree of emphasis on breadth as against depth of knowledge and skills may vary between qualifications granted at this level.

Distinguishing Features of Learning Outcomes

Do the competencies or learning outcomes enable an individual with this qualification to:

- demonstrate understanding of specialised knowledge with depth in some areas
- analyse, diagnose, design and execute judgements across a broad range of technical or management functions
- generate ideas through the analysis of information and concepts at an abstract level
- demonstrate a command of wide-ranging, highly specialised technical, creative or conceptual skills
- demonstrate accountability for personal outputs within broad parameters
- demonstrate accountability for personal and group outcomes within broad parameters

Regulatory Arrangements

Competency Standard Units, Skill Sets and Qualifications in this Training Package have been developed in consultation with the relevant industry technical and business Regulators so that, where appropriate, these align to the requirements of legislation, regulations and mandated codes of practice.

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Licensing and regulatory authorities will recognise a range of Qualifications, Units or Skill Sets contained within this Training Package for respective licensing, registration or accreditation purposes. In constructing these qualifications, EE-Oz Training Standards and respective Regulators have given consideration to the link between the issuance of the qualification and the respective regulatory requirements. It is expected that the assessment and preferred training regime which meets the competency outcomes of the qualification and assessment, will therefore meet the regulatory requirements.
In recognising this interrelationship, every effort has been made to ensure currency in regulatory requirements, thus RTOs must ensure they are observed. This includes utilising any recommended industry training program designed to meet the Competency Standard Units and/or Qualification outcomes related to licensing/registration applications.
As RTO's registered under the Australian Quality Training Framework (AQTF) and VET Quality Framework (Standards and Requirements)"requirements are given full responsibility for deeming a learner/apprentice competent for the respective Competency Standard Units making up a Training Package Qualification or Skill Set, the RTO shall also provide all the necessary documentation (including results preferably percentile based) as required by the regulatory authority to support an application of eligibility for a relevant license, registration or accreditation.
It should be noted that regulatory authorities have advised that the quality of Registered Training Organisations issuing a qualification for regulatory purposes will be monitored. Where deficiencies are identified, regulators may deem it necessary to introduce appropriate actions, including an additional 'external' assessment following the issuing of the qualification to satisfy eligibility requirements for issuing the licence.

Exporting ESI - Generation Industry CSUs from this Training Package

Competency Standard Units in this Training Package are interrelated and linked with the Definitions/Glossary and Essential Knowledge and Associated Skills. This also includes information related to language, literacy and numeracy, access, equity, cultural diversity and any regulatory arrangements for which the Competency Standard Units may apply. No Competency Standard Unit can be used in isolation or exported without these interrelated components.

1.1.01 Electricity Supply Industry - Generation Sector Qualification Framework

1.1 ESI - Generation Industry Qualification Framework

The qualifications listed in this Training Package adhere to the advice provided in the current version of AQF Implementation Handbook. See www.aqf.edu.au.

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The qualifications have been designed to comply with the provisions of and comply with the National Quality Council's (NQC) requirements for Flexibility of Training Package Qualifications to include:

- One Third or more of total units required to gain a VET qualification will be electives.
- The choice of Elective units can be broadened, to allow one sixth of total units to be included from other qualifications in a Training Package, other Training Packages and accredited courses.
- All units as either core or electives.

See:
http://www.nqc.tvetaustralia.com.au/__data/assets/pdf_file/0006/52269/National_Quality_Council_communique.pdf

It should be noted that under these provisions Licensed and trade occupations are exempt from these measures.

Application of the NQC Flexibility Formula

Industry has obtained formal agreement to the continued use of its unit weighting system for valuing individual competency standards and the effort required to achieve a qualification under these provisions.

Thus, for the qualifications in this Training Package, the term "total units required to gain a qualification" and the fractions thereof referred to above are calculated using the weighting points assigned to respective Competency Standard Units (CSU) rather than by a count of individual units. The Qualification Completion Values table below provides the relevant weighting points value of each qualification in order to satisfy the packaging rules in accordance with the NSSC Policy.

To allow for the inclusion of units imported from other qualifications and other Training Packages and accredited courses under this weighting points system, industry also gained agreement to the following process for importing and valuing such imported units, as follows:

Customisation of these qualifications is permitted in order to meet learner's individual needs, their current, intended or future work context, and a variety of possible industry environments.

For this purpose, the importation of units up to one sixth of the total points value required for completion of the qualification is permitted from any one or a combination of the following three sources:

- Elsewhere in this Training Package
- Other Training Packages
- Accredited Courses

Units selected for importation under these provisions shall be first packaged in the source Training Package or Accredited Course at the AQF level of the target qualification.

The importation of units from these sources shall be within the boundaries of the integrity of the intended qualification outcomes, the requirements of the Australian Qualifications Framework, the Australian Quality Training Framework and all regulatory requirements applicable to the imported unit and/or the target qualification.

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Minimum points (10) will be allocated to units imported from sources other than those managed by EE-Oz Training Standards. Advice on the valuation of units selected for importation from sources other than EE-Oz Training Packages shall be sought from the relevant EE-Oz Technical Advisory Committee.

Advice shall be sought from the relevant state/territory registration and accreditation body to determine if there is a requirement for an extension to a Registered Training Organisation's scope of registration in relation to the inclusion of such imported unit/s into a qualification.

Advice shall be sought from the relevant registration and accreditation body regarding the requirement to record and report the inclusion of units imported under these provisions for the purposes of awarding a qualification.

Where units have been imported under these provisions, this shall be reported to EE-Oz Training Standards so that industry is aware of such units and can consider the endorsement of these into the relevant qualification(s).

Qualification Mapping

Please refer to Preliminary Information for:

- Modifications History of Qualifications in this Training Package
- Mapping of the qualifications in this version of the ESI - Generation Sector Training Package to previous versions, including equivalences.
-

1.1.02 Qualification Pathways

1.2 Qualification Pathways

This Training Package provides open entry at each of the AQF levels. Arrows indicate the pathways that can be followed no matter at which qualification level you enter.

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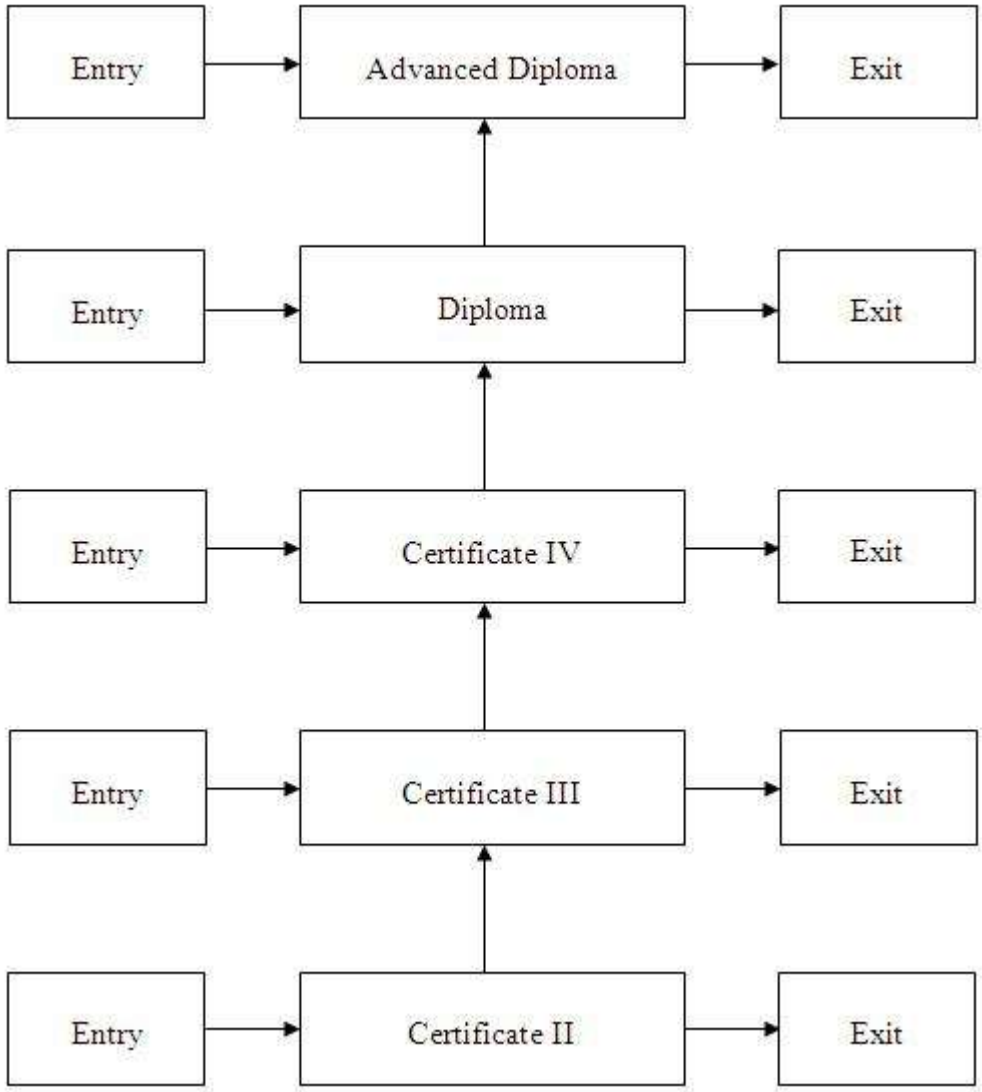
Entry and Exit Points for ESI – Transmission, Distribution and Rail Sector Industry Qualifications



For more information on the latest Training Package vocational standards qualifications and qualification pathways visit ElectroComms and EnergyUtilities Industry Skills Council Ltd trading as EE-Oz Training Standards at www.ee-oz.com.au

Articulation pathways

Qualification articulation and entry and exit arrangements are based on the specific training and education requirements endorsed by the industry. The construction of the Competency standard units and the group of units that make up an individual qualification are of particular significance to the operational, regulatory and safety arrangements of the industry. Each qualification provides a unique vocational outcome that can be used for Australian apprentices as entry-level contracted employees.

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All qualifications are open entry and open exit and are available for use as Australian Apprenticeship entry-level contracted employment. Australian apprenticeship arrangements are subject to State/Territory statutory requirements, prescriptions within industrial instruments and policies of State/Territory training authorities and RTOs. Reference to what applies should therefore be made from respective statutory bodies in the first instance.

Australian Apprenticeship arrangements therefore apply to all qualifications; however, they are subject to State/Territory statutory requirements, prescriptions within industrial instruments and policies of State/Territory training authorities.

Open entry is provided into all qualifications, Open entry is available at all levels provided the prospective learner's general education and competency level is equivalent to the outcome of four to five years of secondary school. Additionally, entry levels provide an option for potential learners to choose a qualification suited to their needs while providing flexibility for recruitment action by employers. What must be satisfied for entry is that any listed prerequisite Competency Standard Unit requirements are met. Entry into all qualifications is also available through Recognised Prior Learning (RPL) arrangements.

School Based Australian Apprenticeships

Australian Apprenticeships are declared in each State or Territory according to the particular processes of the jurisdiction and requirements identified by industry in the State or Territory.

Declarations for particular qualifications as either Traineeships or Apprenticeships are made accordingly and therefore the same qualification may be classified differently between jurisdictions.

Whilst EE-Oz has no control over these processes and declarations, it would recommend that the following qualifications be considered when addressing School based Australian Apprenticeships:

Qualification Code	Qualification Title
Nil	Nil

Access, Equity and Cultural Diversity

The skills required of employees in the Generation Sector are comprehensive. The qualifications in this Training Package reflect the range of competencies required and are written in a non-exclusive manner so as to increase the participation rates of all equity and disadvantaged groups and to minimise unintentional bias.

Language, Literacy and Numeracy

A specific section related to language, literacy and numeracy skills has been included in each Competency standard unit to provide advice on the entry requirements for each unit. It provides Registered Training Organisations (RTOs), industry and career aspirants with relevant language, literacy and numeracy entry-level advice for each Competency standard unit that would maximise an individual's prospects for successful completion of the unit and, where appropriate, the qualification.

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The language, literacy and numeracy definitions and requirements are described in more detail in Part 2.3.1 — Language, Literacy and Numeracy Skills. Each Competency standard unit in references the respective language, literacy and numeracy skills that apply.

Australian Apprenticeship – Application

Australian Apprenticeships are work related competency programs designed for entry-level contracted employment for new entrants to the industry. For further information regarding Australian Apprenticeships and their application in relation to this Training Package refer to Appendix A - Australian Apprenticeship – application. Appendix A is located at the end of Part 1.3.15 – Assessment Guidelines.

1.1.03 Qualification Employability Skills Statements

1.3 Qualification Employability Skills Statements

The Employability Skills facets for each AQF level are described below. These are broad industry requirements that may vary depending on qualification packaging rules and electives selected.

Employability Skills Summary for all Qualifications at AQF Level 2.

The following table contains a summary of the Employability Skills required by the ESI - Generation Industry for all UEP12 ESI - Generation Training Package qualifications at AQF level 2. The Employability Skills facets described here are broad industry requirements that may vary depending on qualification packaging rules and options.

Communication
Collect, organise and understand information related to the work task and its relevant safety procedures
Communicate ideas and information to enable confirmation of work requirement and specifications
Co-operate with other workers/customers and report outcomes and/or any problems
Access, read and comprehend safety instructions and procedures
Share information via speech and in writing
Prepare time sheets
Teamwork
Work with others to generate and review ideas
Work effectively as an individual and as a member of a team
Work with others and in a team to identify work needs and review ideas against those needs
Relate to people from a range of social, cultural and ethnic backgrounds and physical

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and mental abilities
Contribute to a positive culture of compliance within an organisation
Develop and maintain networks for the implementation and maintenance of industry knowledge, standards and requirements
Provide feedback
Problem Solving
Apply lateral thinking ideas to generate solutions in response to work problems
Anticipate or clarify problems to avoid interruptions to work flows and processes
Identify, assess and prioritise work risks to maintain efficiency, quality, productivity and work place safety at all times
Initiative & Enterprise
Identify and comply with all requirements and standards for work in the ESI - Generation Industry
Apply enterprise best practice and quality systems
Interact effectively with both internal and external industry stakeholders
Initiate and follow through on the implementation of industry standards in the workplace
Planning & Organising
Plan and organise activities including the maintenance and layout of own worksite and obtain equipment and materials to avoid work flow interruptions or wastage
Identify related industry compliance requirements
Maintain relevant industry and work records
Establish clear implementation goals and deliverables
Collect, analyse and organise work task information
Apply time management prioritising techniques
Self Management
Plan own work within given task parameters
Set, monitor and satisfy personal work goals
Accept responsibility for given tasks
Apply systematic and effective time management
Learning
Satisfy the competency requirements for the job
Maintain current knowledge of tools, devices, instruments, materials, work practices

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and systems
Seek learning opportunities
Take control and manage own learning
Adopt a open approach to new ideas and techniques
Commit to and promote a culture of continuous learning
Set realistic learning goals for self development
Monitor and respond to learning process achievements
Technology
Use workplace technology related to the particular work tasks including tools, devices, instruments and materials
Attain and maintain required technical accreditation/authority under the industry standards
Attain and maintain IT skills relevant to the ESI - Generation Industry
Be willing to gain knowledge and skills relevant to new and emerging technologies

The Employability Skills described above are representative of the ESI - Generation Industry in general and may not reflect enterprise specific requirements or job roles.

Learning and assessment strategies for each qualification should be based on the requirements of the units of competency comprising the qualification and the Assessment Guidelines, Part 1.3.00.

Employability Skills Summary for all Qualifications at AQF Level 3.

The following table contains a summary of the Employability Skills required by the ESI - Generation Industry for all UEP12 ESI - Generation Training Package qualifications at AQF level 3,

The Employability Skills facets described here are broad industry requirements that may vary depending on qualification packaging rules and options.

Communication
Collect, organise and understand information related to the work task and its relevant safety procedures
Communicate ideas and information to enable confirmation of work requirement and specifications
Communicate information using drawing, diagrams, schedules and manuals
Communicate and/or report work outcomes and/or any problems
Communicate ideas, information and advice to co-workers/clients to enable confirmation of product/work requirements and specifications

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Communicate effectively in oral and written form
Access, read and comprehend safety instructions and procedures
Collect, organise and understand information related to a work task and its relevant safety procedures
Undertake negotiations if there are conflicts in work requirements and/or priorities
Share industry information
Document work quotations and tender support schedules
Prepare time sheets
Prepare documentation on particular work tasks including evaluations, reports, timesheets and costings
Prepare and present formal reports to clients and/or co-workers
Teamwork
Work with others to generate ideas and review
Work effectively as an individual and as a member of a team
Work with others and in a team to identify work needs and review ideas against those needs
Work with other and in a team to evaluate and report on work tasks and outcomes
Work with others and in a team to present information to a client and/or co-worker
Relate to people from a range of social, cultural and ethnic backgrounds and physical and mental abilities
Influence individuals and teams
Develop and maintain networks for implementation and maintenance of industry standards in relation to workplace computer systems
Develop and maintain networks for the implementation and maintenance of industry knowledge, standards and requirements
Coach/mentor others and provide feedback
Problem Solving
Apply lateral thinking ideas to generate solutions in response to work problems
Apply operational research and research management skills
Clarify and identify work issues and apply processes to avoid interruptions to work flow/processes
Clarify problems and enterprise ideas to avoid interruptions to work flow/processes
Use testing techniques to anticipate or clarify problems to avoid interruptions to work flows and process

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Generate ideas and alternatives
Analyse information to identify opportunities to develop solutions
Identify, assess and prioritise work risks to maintain efficiency, quality, productivity and work place safety at all times
Initiative & Enterprise
Recognise and respond to circumstances outside instructions or personal competence
Be proactive and apply strategies to overcome work blockages
Adopt proactive relationships with clients and co-workers
Identify and comply with all requirements and standards for work in the ESI - Generation Industry
Apply enterprise best practice and quality systems
Generate ideas and translate into workplace actions and outcomes
Interact effectively with both internal and external industry stakeholders
Initiate and follow through on the implementation of the industry standards in the workplace
Translate ideas into action
Planning & Organising
Plan and organise activities including the maintenance and layout of own worksite and obtain equipment and materials to avoid work flow interruptions or wastage
Plan and organise activities to enable choices of maintenance methods of equipment, tools and related work documentation
Plan activities to enable choice of analysis/testing techniques of work outcomes and systems
Develop industry work plans including key performance indicators
Use mathematical ideas and techniques to correctly complete measurements, calculate quantities, estimate material, labour and overhead requirements and accurately cost the product/service
Use computing capabilities that enable the use of mathematical ideas and techniques to correctly complete measurements, calculate quantities, estimate material, labour and overhead requirements and accurately cost the product/service
Identify related industry compliance requirements
Identify, access and allocate required implementation resources
Maintain relevant industry and work records
Maintain relevant industry/work record systems
Maintain industry related records

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Understand computer systems, their relationships and applications in the workplace
Establish clear implementation goals and deliverables
Monitor and optimise resource utilisation
Self Management
Plan own work within given task parameters
Set, monitor and satisfy personal work goals
Accept responsibility for given tasks
Clarify and confirm work instructions
Clarify own roles, goals, prerogatives and limitations in relation to the industry
Take responsibility for industry obligations
Evaluate and monitor own performance
Apply systematic and effective time management
Learning
Satisfy the competency requirements for the job
Maintain current knowledge of tools, devices, instruments, materials, work practices and systems
Seek learning opportunities
Provide technical instruction and learning assistance to assigned apprentices, trainees or other less experienced workers
Take control and manage own learning
Adopt a open approach to new ideas and techniques
Commit to and promote a culture of continuous learning
Set realistic learning goals for self development
Monitor and respond to learning process achievements
Technology
Use workplace technology to communicate with the client, document and present information
Use electronic information systems to communicate with co-workers and/or other related personnel
Use workplace technology related to the particular work tasks including tools, devices, instruments and materials
Use work place technology to collate, organise and maintain work documentation and information
Attain and maintain required technical accreditation/authority under the industry

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standards
Attain and maintain IT skills relevant to the ESI - Generation Industry
Be willing to learn new IT skills
Be willing gain knowledge and skills relevant to new and emerging technologies

The Employability Skills described above are representative of the ESI - Generation Industry in general and may not reflect enterprise specific requirements or job roles.

Learning and assessment strategies for each qualification should be based on the requirements of the units of competency comprising the qualification and the Assessment Guidelines, Part 1.3.00.

Employability Skills Summary for all Qualifications at AQF Level 4.

The following table contains a summary of the Employability Skills required by the ESI - Generation Industry for all UEP12 ESI - Generation Training Package qualifications at AQF level 4.

The Employability Skills facets described here are broad industry requirements that may vary depending on qualification packaging rules and options.

Communication
Collect, organise and understand information related to the work task and its relevant safety procedures
Communicate ideas and information to enable confirmation of work requirement and specifications
Communicate information using drawing, diagrams, schedules and manuals
Communicate and/or report work outcomes and/or any problems
Communicate effectively in oral and written form
Access, read and comprehend safety instructions and procedures
Undertake negotiations if there are conflicts in work requirements and/or priorities
Share industry information
Share essential business information
Document work quotations and tender support schedules
Process approvals/authorities for industry activities
Prepare time sheets
Prepare documentation on particular work tasks including evaluations, reports, timesheets and costings
Prepare and present formal reports to clients and/or co-workers or other related personnel

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Teamwork
Work with others by recognising dependencies and using co-operative approaches to optimise work flow and productivity
Work with others to generate ideas and review
Work effectively as an individual and as a member of a team
Work with others to identify work needs and review ideas against those needs
Work with others to evaluate and report on work tasks and outcomes
Work with others to present information to a client and/or co-worker(s)
Relate to people from a range of social, cultural and ethnic backgrounds and physical and mental abilities
Influence individuals and teams
Develop and maintain networks for the implementation and maintenance of industry knowledge, standards and requirements
Coach/mentor others and provide feedback
Problem Solving
Use testing and analysis techniques to anticipate and/or clarify problems and plan around them to avoid interruptions to work flows/processes
Apply lateral thinking to generate solutions in response to work problems
Apply analytical techniques to anticipate design issues and product needs
Apply operational research and research management skills
Clarify and identify work issues and apply processes to avoid interruptions to work flow/processes
Analyse information to identify opportunities to develop solutions
Identify, assess and prioritise work risks to maintain efficiency, quality, productivity and work place safety at all times
Initiative & Enterprise
Recognise and respond to circumstances outside instructions or personal competence
Create new opportunities for the enterprise
Be proactive and apply strategies to overcome work blockages
Adopt a proactive relationship with clients/co-workers
Identify work needs by applying research techniques
Identify and comply with all requirements and standards for work in the ESI - Generation Industry
Apply best practice and quality systems

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Apply computer systems and applications to ensure quality and efficiency of work tasks and documentation
Generate ideas and translate into workplace actions and outcomes
Interact effectively with both internal and external industry stakeholders
Initiate and follow through on the implementation of industry standards in the workplace
Translate ideas into action
Planning & Organising
Plan and organise activities including the maintenance and layout of own worksite and obtain equipment and materials to avoid work flow interruptions or wastage
Plan and organise activities to enable choices of maintenance methods of equipment, tools and related work documentation
Plan activities to enable choice of analysis/testing techniques of work outcomes and systems
Plan and organise activities to enable the most appropriate testing/analysis procedures to be implemented
Plan activities to enable choice of the best computer systems/programs for application on a particular work task
Develop industry work plans including key performance indicators
Use mathematical ideas and techniques to correctly complete measurements, calculate quantities, estimate material, labour and overhead requirements and accurately cost the product/service
Use computing capabilities that enable the use of mathematical ideas and techniques to correctly complete measurements, calculate quantities, estimate material, labour and overhead requirements and accurately cost the product/service
Identify related industry compliance requirements
Identify, access and allocate required implementation resources
Maintain relevant industry and work records
Maintain relevant industry/work record systems
Maintain industry related records
Understand computer systems, their relationships and applications in the workplace
Establish clear implementation goals and deliverables
Monitor and optimise resource utilisation
Self Management
Plan own work within given task parameters

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Maintain current knowledge of computer systems and capabilities
Set, monitor and satisfy personal work goals
Accept responsibility for given tasks
Clarify and confirm work instructions
Clarify own roles, goals, prerogatives and limitations in relation to the industry
Take responsibility for industry obligations
Evaluate and monitor own performance
Apply systematic and effective time management
Learning
Satisfy the competency requirements for the job
Maintain current knowledge of tools, devices, instruments, materials, work practices and systems
Maintain current knowledge of computer systems programs and there relevant applications
Seek learning opportunities
Provide technical instruction and learning assistance to assigned apprentices, trainees or other less experienced workers
Take control and manage own learning
Adopt a open approach to new ideas and techniques
Commit to and promote a culture of continuous learning
Set realistic learning goals for self development
Monitor and respond to learning process achievements
Technology
Use workplace technology to document and present information
Use workplace technology to communicate with clients, co-workers and/or other related personnel
Use workplace technology related to particular work tasks including tools, equipment, devices, instruments and materials
Use workplace technology for data analysis/investigation
Attain and maintain required technical accreditation/authority under the industry standards
Attain and maintain IT skills relevant to the ESI - Generation Industry
Be willing to learn new IT skills
Use workplace technology to collate, organise and maintain work documentation and

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information
Use computer applications as a management tool

The Employability Skills described above are representative of the ESI - Generation Industry in general and may not reflect enterprise specific requirements or job roles.

Learning and assessment strategies for each qualification should be based on the requirements of the units of competency comprising the qualification and the Assessment Guidelines, Part 1.3.00.

Employability Skills Summary for all Qualifications at AQF Level 5.

The following table contains a summary of the Employability Skills required by the ESI - Generation Industry for all UEP12 ESI – Generation Training Package qualifications at AQF level 5,

The Employability Skills facets described here are broad industry requirements that may vary depending on qualification packaging rules and options.

Communication
Collect, organise and understand information related to the work task and its relevant safety procedures
Communicate ideas and information to enable confirmation of work requirement and specifications
Communicate information using drawing, diagrams, schedules and manuals
Communicate and/or report work outcomes and/or any problems
Communicate effectively in oral and written form
Access, read and comprehend safety instructions and procedures
Undertake negotiations if there are conflicts in work requirements and/or priorities
Share industry information
Share essential business information
Document work quotations and tender support schedules
Process approvals/authorities for industry activities
Prepare time sheets
Prepare documentation on particular work tasks including evaluations, reports, timesheets and costings
Prepare and present formal reports to clients and/or co-workers or other related personnel
Use aesthetic ideas to plan visual presentation material

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Teamwork
Work with others by recognising dependencies and using co-operative approaches to optimise work flow and productivity
Work with others to generate ideas and review
Work effectively as an individual and as a member of a team
Work with others to identify work needs and review ideas against those needs
Work with others to evaluate and report on work tasks and outcomes
Work with others to present information to a client and/or co-worker(s)
Relate to people from a range of social, cultural and ethnic backgrounds and physical and mental abilities
Influence individuals and teams
Develop and maintain networks for the implementation and maintenance of industry knowledge, standards and requirements
Coach/mentor others and provide feedback
Problem Solving
Use testing and analysis techniques to anticipate and/or clarify problems and plan around them to avoid interruptions to work flows/processes
Apply lateral thinking to generate solutions in response to work problems
Apply analytical techniques to anticipate design issues and product needs
Apply operational research and research management skills
Apply contingency management techniques to variable circumstances
Clarify and identify work issues and apply processes to avoid interruptions to work flow/processes
Analyse information to identify opportunities to develop solutions
Identify, assess and prioritise work risks to maintain efficiency, quality, productivity and work place safety at all times
Initiative & Enterprise
Recognise and respond to circumstances outside instructions or personal competence
Create new opportunities for the enterprise
Be proactive and apply strategies to overcome work blockages
Adopt a proactive relationship with clients/co-workers
Identify work needs by applying research techniques
Identify and comply with all requirements and standards for work in the ESI - Generation Industry

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Apply best practice and quality systems
Apply computer systems and applications to ensure quality and efficiency of work tasks and documentation
Generate ideas and translate into workplace actions and outcomes
Interact effectively with both internal and external industry stakeholders
Initiate and follow through on the implementation of industry standards in the workplace
Translate ideas into action
Planning & Organising
Plan and organise activities including the maintenance and layout of own worksite and obtain equipment and materials to avoid work flow interruptions or wastage
Plan and organise activities to enable choices of maintenance methods of equipment, tools and related work documentation
Plan activities to enable choice of analysis/testing techniques of work outcomes and systems
Plan and organise activities to enable the most appropriate testing/analysis procedures to be implemented
Plan activities to enable choice of the best computer systems/programs for application on a particular work task
Develop industry work plans including key performance indicators
Use mathematical ideas and techniques to correctly complete measurements, calculate quantities, estimate material, labour and overhead requirements and accurately cost the product/service
Use computing capabilities that enable the use of mathematical ideas and techniques to correctly complete measurements, calculate quantities, estimate material, labour and overhead requirements and accurately cost the product/service
Identify related industry compliance requirements
Identify, access and allocate required implementation resources
Maintain relevant industry and work records
Maintain relevant industry/work record systems
Maintain industry related records
Understand computer systems, their relationships and applications in the workplace
Establish clear implementation goals and deliverables
Monitor and optimise resource utilisation

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Self Management
Plan own work within given task parameters
Set, monitor and satisfy personal work goals
Accept responsibility for given tasks
Clarify and confirm work instructions
Clarify own roles, goals, prerogatives and limitations in relation to the industry
Take responsibility for industry obligations
Evaluate and monitor own performance
Apply systematic and effective time management
Learning
Satisfy the competency requirements for the job
Maintain current knowledge of tools, devices, instruments, materials, work practices and systems
Maintain current knowledge of computer systems programs and there relevant applications
Seek learning opportunities
Provide technical instruction and learning assistance to assigned apprentices, trainees or other less experienced workers
Take control and manage own learning
Adopt a open approach to new ideas and techniques
Commit to and promote a culture of continuous learning
Set realistic learning goals for self development
Monitor and respond to learning process achievements
Technology
Use workplace technology to document and present information
Use workplace technology to communicate with clients, co-workers and/or other related personnel
Use workplace technology related to particular work tasks including tools, equipment, devices, instruments and materials
Use workplace technology for data analysis/investigation
Attain and maintain required technical accreditation/authority under the industry standards
Attain and maintain IT skills relevant to the ESI - Generation Industry

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Be willing to learn new IT skills
Use workplace technology to collate, organise and maintain work documentation and information
Use computer applications as a management tool

The Employability Skills described above are representative of the ESI - Generation Industry in general and may not reflect enterprise specific requirements or job roles.

Learning and assessment strategies for each qualification should be based on the requirements of the units of competency comprising the qualification and the Assessment Guidelines, Part 1.3.00.

1.1.04 Qualification Scopes

1.4 Qualification Scopes

The qualifications described in this section of the Training Package have been designed and structured by industry in consultation with a range of stakeholders including regulators, RTOs and the community. They address identified work functions and work environments and facilitate worthwhile career pathways within the industry.

The qualification structures that follow must be read in conjunction with Part 1.2.03 — Competency Standards, Unit Construction.

UEP20112 Certificate II in ESI Generation (Operations Support)

Those gaining this qualification will be able to complete work functions such as:

- Local operation of non critical plant systems, lubrication of plant, undertake minor maintenance of both electrical and mechanical equipment, plant cleaning, and the operation of mobile load shifting plant and equipment, observation of safe working practices and environmental procedures.

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UEP30112 Certificate III in ESI Generation (Systems Operation)

Those gaining this qualification will be able to complete work function such as:

- Local operation of plant systems, isolation of plant systems for work, operation of plant systems, operation of network equipment via Data Acquisition Systems, observation of safe working practices and environmental procedures.

UEP30212 Certificate III in ESI Generation (Operations)

Those gaining this qualification will be able to complete work function such as:

- Local operation of plant systems, isolation of plant systems for work, operation of plant systems, routine observation and maintenance of plant and equipment in operation, observation of civil plant and infrastructure observation of safe working practices and environmental procedures.

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UEP40112 Certificate IV in ESI Generation (Systems Operation)

Those gaining this qualification will be able to complete work function such as:

- Remote operation of network equipment and isolation of plant and equipment for work, coordination of work activities, cost estimations, Observation of safe working practices and environmental procedures. Supervision of others and coordination of work activities of individuals and/or teams

UEP40212 Certificate IV in ESI Generation (Operations)

Those gaining this qualification will be able to complete work function such as:

- Operation of plant systems, isolation of plant systems, start-up and shut down of boilers, turbines, reciprocating engines, start-up and shut down of gas turbines, start-up and shut down of hydro plant, Observation of safe working practices and environmental procedures. Supervision of others and coordination of work activities of individuals and/or teams

UEP40312 Certificate IV in ESI Generation Maintenance (Mechanical)

Those gaining this qualification will be able to complete work function such as:

- Installation, repair and maintenance of plant and mechanical systems, maintenance planning and scheduling.
- Observation of safe working practices and environmental procedures. Supervision of others and coordination of work activities of individuals and/or teams

UEP40412 Certificate IV in ESI Generation Maintenance (Fabrication)

Those gaining this qualification will be able to complete work function such as:

- Installation, fabrication repair and maintenance of industrial pressure vessels and associated pipe work, coded welding, coded welding, welding supervision, general fabrication.
- Observation of safe working practices and environmental procedures. Supervision of others and coordination of work activities of individuals and/or teams

UEP40512 Certificate IV in ESI Generation Maintenance (Electrical/Electronic)

This qualification provides competencies to:

- manufacture, fit, assemble, erect, operate, test, fault find, alter, repair electrical equipment, electronic, instrumentation systems, and includes electrical wiring work only if that work is associated with assembling, maintaining, terminating or altering the wiring between electrical components within a power generating plant or machinery, maintenance planning and scheduling and supervision of others and coordination of work activities of individuals and/or teams.
- Electrical equipment means any appliance, article, accessory, wire, fitting, cable, conduit or apparatus that generates, uses, conveys or controls (or that is intended to generate, use, convey or control) electricity above extra low voltage.

This qualification does not authorise the holder to install any electrical wiring systems

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within an electrical installation as prescribed by definitions contained in AS/NZS 3000.

UEP40612 Certificate IV in Large Scale Wind Generation - Electrical

This qualification provides competencies to operate, test, fault find, alter, repair electrical equipment and systems associated with large scale wind power generation. It includes the requirements for an 'Electrical Fitter licence'.

UEP50112 Diploma of ESI Generation (Systems Operation)

Those gaining this qualification will be able to complete work function such as:

- Remote operation of network systems. Isolation of plant systems for work. Develop operational procedures and systems. Manage the start-up and shut down of boilers and turbines, hydro plant, gas turbines. Implementation of safe working practices and environmental procedures. Management and supervision of others and coordination of work activities of individuals and/or teams

UEP50212 Diploma of ESI Generation (Operations)

Those gaining this qualification will be able to complete work function such as:

- Develop operational procedures and systems. Manage the start-up and shut down of boilers and turbines, hydro plant, gas turbines. Implementation of safe working practices and environmental procedures. Management and supervision of others and coordination of work activities of individuals and/or teams

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UEP50312 Diploma of ESI Generation (Maintenance)

Those gaining this qualification will be able to complete work function such as:

- Development of maintenance Schedules and project management. Development of operational procedures and systems, Implementation of safe working practices and environmental procedures. Management and supervision of others and coordination of work activities of individuals and/or teams

UEP50412 Diploma of ESI Generation (Electrical/Electronic)

Those gaining this qualification will be able to complete work function such as:

- The manufacture, fitting, assembly, erection, operation, testing, fault finding, alteration and , repair of electrical equipment, electronic, instrumentation systems, and including electrical wiring work only if that work is associated with assembling, maintaining, terminating or altering the wiring between electrical components within a power generating plant or machinery.
- Development of maintenance schedules and project management. Implementation of safe working practices and environmental procedures. Management and supervision of others and coordination of work activities of individuals and/or teams.
- Electrical equipment means any appliance, article, accessory, wire, fitting, cable, conduit or apparatus that generates, uses, conveys or controls (or that is intended to generate, use, convey or control) electricity above extra low voltage.

This qualification does not authorise the holder to install any electrical wiring systems within an electrical installation as prescribed by definitions contained in AS/NZS 3000.

There are no Advanced Diploma Qualifications in this Training Package.

1.1.05 Qualifications and Packaging Rules

1.5 Qualifications and Packaging Rules

The following table details the full range of qualifications in this version of the ESI – Generation Sector Training Package, the completion requirements for each qualification and their respective structure and composition. These qualifications have been designed to comply with the National Quality Council's Packing Rules for Flexibility initiative.

Each qualification is described by the number of core and elective weighted points required for completion and issue of the qualification under the AQF.

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Respective qualifications have at least two Elective Groups from which elective competencies may be drawn. Where a range of weighting points is set for a group e.g. 60-120, the lower number indicates both the minimum weighting points required from that particular elective group for completion and the larger number is the maximum required weighting points which may be selected from that group for a valid qualification completion.

Where the lower number for a group is 0 no competencies are required to be selected from that group, however, sufficient weighted points must be selected from other groups to meet the required total elective weighted points for completion.

Note: Individuals may select elective units to a weighting point total greater than the maximum specified for completion from a particular group. Where this is done weighted points in excess of the specified maximum cannot be counted for completion of the qualification.

Where a Competency Standard Unit has pre-requisite Competency Standards Unit requirements, such pre-requisite units shall be completed and their weighted points counted toward qualification completion.

Full details of each qualification follow Table 1 -Qualification Completion Values, below.

Table 1 - Qualification Completion Values

Qualification Code	Qualification Title	Total Core	Total Elective	Elective Units Groups				
				Group A	Group B	Group C	Group D	Group E
UEP20112	CII in ESI Generation (Operations Support)	140	220	0-60	160-220			
UEP30112	CIII in ESI Generation (Systems Operations)	330	630	0-160	470-630			
UEP30212	CIII in ESI Generation (Operations)	340	620	0-160	460-620			
UEP40112	CIV in ESI Generation (Systems Operations)	480	800	0-220	0-700	100-800		
UEP40212	CIV in ESI Generation (Operations)	520	760	0-220	0-620	140-760		
UEP40312	CIV in ESI Generation Maintenance (Mechanical)	770	510	0-220	0-310	200-510		
UEP40412	CIV in ESI Generation Maintenance	750	530	0-220	0-410	120-530		

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	(Fabrication)							
UEP40512	CIV in ESI Generation Maintenance (Electrical/Electronics)	820	460	0-220	0220	240-460		
UEP40612	CIV in Large Scale Wind Generation - Electrical	900	380	0-60	0-120	260-380		
UEP50112	Diploma of ESI Generation (Systems Operations)	640	960	0-270	0-660	0-100	200-920	
UEP50212	Diploma of ESI Generation (Operations)	690	910	0-270	0-490	0-180	240-910	
UEP50312	Diploma of ESI Generation (Maintenance)	590	1010	0-270	0-770	0-120	180-880	
UEP50412	Diploma of ESI Generation Electrical/Electronic)	1000	600	0-270	0-180	0-240	180-540	

1.1.06 Skill Sets

1.6 Skill Sets

Definition

Skill sets are defined as single units of competency, or combinations of units of competency from an endorsed Training Package, which link to a licence or regulatory requirement, or defined industry need.

Skill sets are a way of publicly identifying logical groupings of units of competency which meet an identified need or industry outcome. Skill sets are not qualifications.

Where skill sets are identified in a Training Package, the Statement of Attainment can set out the competencies a person has achieved in a way that is consistent and clear for employers and others. This is done by including the wording ‘these competencies meet [insert skill set title or identified industry area] need’ on the Statement of Attainment. This wording applies only to skill sets that are formally identified as such in the endorsed Training Package. See the 2010 edition of the AQF Implementation Handbook for advice on wording on Statements of Attainment. See:
http://www.aqf.edu.au/Portals/0/Documents/Handbook/AQF_Handbook_07.pdf

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Identified Skill Sets

The following Skill Sets have been developed to meet the requirements for High Risk Licences to operate Steam Turbines and Reciprocating Steam Engines. The High Risk Licensing units in these Skill Sets are included in qualifications.

1.2 Competency Standards Index

Volume 1 - Part 2

1.2.00 Competency Standards

2.0 Introduction

This section outlines how the competency standards were developed in broad terms. The industry coverage they can apply to, as well as the format and construction of the individual Competency Standard Units is provided. Matters related to language, literacy and numeracy, access and equity and the regulatory environment in which the units may apply is also covered, as is the interrelated Essential Knowledge and Associated Skills. Competency Standard Units in this Training Package are interrelated and linked with the Definitions/Glossary and Essential Knowledge and Associated Skills sections. No Competency Standard Unit can be used in isolation or exported without these interrelated components.

A definitions/glossary to complement the Competency Standard Units is included in Part 2.1. It provides a description of the words used in the Competency Standard Units to define terms in more detail. It also forms an integral part of each unit. An Essential Knowledge and Associated Skills section follows the Competency Standard Units and also forms an integrated part of each unit.

Included in this section is:

- an index of the Competency Standard Units with their weighting points
- a list of imported Competency Standard Units

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1.2.01 Development of Competency Standards for the ESI - Generation Sector

2.1 Development of Competency Standards for the ESI - Generation Sector

Competency Standards were initially developed for Generation Production Plant in 1996. These competency standard units were updated and incorporated into the new Training Package framework and were endorsed in 1998 as the Training Package for the Electricity Supply Industry – Generation Sector of the Utilities Industry (UTP98). Subsequent amendments were made to qualifications, and variations and additions to competency standard units have been completed since 1998. As a result, these units have again been revised to now make up the group of units within this Training Package (UEP12). They cover a broad range of knowledge and skills applied in the Generation industry.

The development project satisfied the following characteristics:

- EE-OZ Training Standards and its nationwide focus groups were appropriately representative of the industry throughout Australia.
- Development, consultation, and validation included appropriate processes with a wide range of industry employer/employee, practitioners, providers, stakeholders/community, and regulatory and government agency representatives.
- The draft standards were distributed throughout the national, State and Territory ITAB network and to industry stakeholders and, feedback from other industries was also actively encouraged.
- The competency standards have been subject to further scrutiny during the process of developing this Training Package that contains vocational standards for the Industry.

1.2.02 Industry Coverage

2.2 Industry Coverage

The Electricity Supply Industry Generation Sector (ANZSIC Code 3610) is defined as consisting of plant and equipment that is mainly engaged in the generation, transmission or distribution of electricity.

Generation encompasses all activities from the point of supply/acceptance of energy resources and consumables to the point of exit of electrical energy and by-products of the generation processes. Within these boundaries it includes all operations, maintenance, systems support, scientific, engineering and design support, management, marketing and administration functions required to establish and meet business objectives.

The sector has been characterised during the last few years by reductions in the size of the workforce, the privatisation of many enterprises and the out-sourcing of many functions and activities.

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Notwithstanding these changes these Competency Standards cover approximately one third of the Electricity Supply Industry's direct workforce of 47,000 employees. The Standards may also provide coverage for the increasing contractor workforce, which is required to support sector activities.

The preceding statements should not be construed as the national ESI – Generation Sector Training Package has having coverage of any particular industry or sector of industry. The intent of the national ESI – Generation Sector Training Package is to describe the skills and knowledge, which pertain to vocations within the field of Generation, and to offer a choice and range of qualifications or competency standard units through appropriate training for organisations, and personnel seeking formal recognition of respective skills and knowledge. It is recognised that other training pathways may exist in the form of other Training Packages and arrangements.

The Generation Industry contributes greatly to the economic and future needs of Australia. Appendix 2 – The Electricity Generation Industry describes the Industry in detail.

Other industry standards

It is recognised that the ESI - Generation Industry Standards do not cover all the competencies, which are likely to be required and applied within organisations and workplaces. Nationally endorsed competency standards from other industries can be used where appropriate, provided they are imported in accordance with the criteria outlined in this Training Package.

Language, literacy, numeracy

The competency standards have been written to reflect the technical and operational needs of industry and include appropriate language, literacy and numeracy requirements.

Access and equity

The knowledge and skill required of employees in the ESI - Generation Industry is comprehensive. The Competency Standards reflect the range of knowledge and skills required and are written in a non-exclusive manner so as to increase the participation rates of under-represented groups and to minimise unintentional bias.

Contextualisation

In the Competency Standard Units, 'notes' have been placed against respective aspects that include scope, Performance Criteria, Range Statement and Essential Knowledge and associated skills and other related sections. The insertion of these 'notes' is primarily to provide users and support material developers with examples of the form and type of technical content principles, technology, equipment or processes required. The examples should be treated as information that adds clarity and provides guidance regarding the depth and breadth of learning objectives.

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As the type, form, process or technique of technology and equipment may change it is expected and indeed incumbent on RTOs to be current in the content and delivery arrangements. It is therefore appropriate for RTOs to use the notes as advisory information. In these instances RTOs should aim to accommodate the adoption of improved and new technologies in the scope/range and essential knowledge and associated skills of the Competency Standard Units by varying the context examples given in the referenced 'notes' to the Performance Criteria, Range Statement and Essential knowledge and associated skills. However, the contextualisation must not be such that the outcome of the Competency Standard Units is altered in any way.

Where contextualisation of the notes varies the outcome of the Competency Standard Unit and its related content, RTOs should consult with EE-Oz Training Standards to explore options for incorporating and/or covering the new arrangements, so that currency of the Training package is maintained.

It should be noted that any need to alter a Competency Standard Units from its intended outcome requires a new or varied Competency Standard Units. Such changes are to be undertaken through the continuous improvement processes required of Training Packages, which in relation to this Training Package is managed by EE-Oz Training Standards.

Also refer to Part 1.0.00 — Qualifications Framework, of this ESI - Generation Industry Training Package.

1.2.03 Unit Construction

2.3 Unit Construction

Competency Standard Units that have been successfully attained by learners are to be acknowledged. Some units have been constructed in a manner that will allow reporting without further explanation. However, there are units from related Utilities Industry Training Packages that have been constructed in a manner that requires further reporting of relevant transferable information, i.e. a reporting statement of information that is meaningful for maximum recognition and skills transfer. Generally this would be any endorsement or subset of the unit, as well as detailed formal advice about essential knowledge and skills.

If, in future developments of this Training Package, endorsements are included, further information will be provided. Information can be found in the ESI - Generation Sector Training Package or the Electrotechnology Training Package.

Pre-requisites

It is important to note that in relation to training delivery of pre-requisites Competency Standard Units, training and formative staged assessments may be delivered for all, or part of the sequence of Competency Standard Units concurrently and at a different stage to the final assessment of each unit. However, the final assessment event and judgement for attributing competence for each unit is to follow the prerequisite sequence.

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Exporting CSUs from this Training Package

No Standard Competency Unit from this Training Package is to be used in isolation or exported without including all relevant interrelated components such as definitions, glossary, essential knowledge and skills, matters related to language, literacy and numeracy, access, equity, cultural diversity or any regulatory arrangements that apply.

1.2.04 Assessment Guidlines

2.4 Assessment Guidelines

The ESI - Generation Industry has developed guidelines for the assessment of these standards. The guidelines are included at Part 1.3.00 of this Training Package.

1.2.05 National Qualifications

2.5 National Qualifications

The ESI - Generation Industry has identified qualifications, which are linked to and use the competency standards. These are included in Part 1.0.00 — Qualifications Framework of this Training Package.

A list of the qualification titles contained in this Training Package is provided in Part 1.1.05. Included in this section are details of the content and composition of the qualifications, the Industry Qualifications Framework, completion requirements and the rules for structuring and flexibility arrangements and the qualifications structure for each qualification. Further, there is a full description provided for each qualification, which explains its application and gives added meaning to the group of units making up the respective qualification.

1.2.06 Regulatory Arrangements — ESI - Generation Sector

2.6 Regulatory Arrangements — ESI - Generation Sector

The ESI - Generation Sector is subject to a high level of regulation and codes of practice related to the supply of electricity and the operation of equipment, apparatus and the like in the supply of such services. The regulations and codes of practice are based on principles of the supply of electricity involving equipment, apparatus and systems, public safety, safety and health of individuals who work on systems and apparatus/equipment and other codes and practices related to the environment in which they are installed and maintained.

Competency Standard Units in this Training Package have been developed in consultation with the relevant industry technical and business Regulators so that, where appropriate, these align to the requirements of legislation, regulations and mandated codes of practice.

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Licensing and regulatory authorities will recognise a range of Competency Standard Units contained within this Training Package for respective licensing, registration or accreditation purposes. In constructing these Competency Standard Units, EE-Oz Training Standards and respective Regulators have given consideration to the link between the delivery and assessment of Competency Standard Units and the respective regulatory requirements. It is expected that the assessment and preferred training regime which meets a Competency Standard Unit's delivery and assessment requirements will therefore meet the relevant regulatory requirements.

In recognising this interrelationship, every effort has been made to ensure currency in regulatory requirements, thus RTOs must ensure they are observed. This includes utilising any recommended industry training program designed to meet Competency Standard Units which are related to licensing/registration applications.

As RTO's registered under the Australian Quality Training Framework (AQTF) and VET Quality Framework (Standards and Requirements)" requirements are given full responsibility for deeming a learner/apprentice competent for the respective Competency Standard Units within this Training Package. The RTO shall also provide all the necessary documentation (including results preferably percentile based) as required by the regulatory authority to support an application of eligibility for a relevant license, registration or accreditation.

It should be noted that regulatory authorities have advised that the quality of Registered Training Organisations awarding Competency Standard Units for regulatory purposes will be monitored. Where deficiencies are identified, regulators may deem it necessary to introduce appropriate actions, including an additional 'external' assessment following the issuing of the qualification to satisfy eligibility requirements for issuing the licence.

Statutes, regulations and codes of practice

The ESI - Generation Industry is covered by Federal, State and Territory Gas Safety, Telecommunications, Occupational Health and Safety and Work Cover Acts as well as other statutes, regulations, industrial instruments, codes of practice, guidelines and advisory standards, Australian/New Zealand and International Standards.

State and Territory Regulators

Jurisdiction	Organisation	Website	Telephone Number
Australian Capital Territory	ACT Planning and Land Authority	www.actpla.act.gov.au	02 6207 1923
New South Wales	Office of Fair Trading	www.fairtrading.nsw.gov.au	133 220
Northern Territory	NT WorkSafe	www.worksafe.nt.gov.au	1800 019 115
Queensland	Department of Mines and Energy	http://www.dme.qld.gov.au/Energy/gas.cfm	07 3237 1626
South	Office of the	http://www.sa.gov.au/government/enti	08 8226

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Australia	Technical Regulator	ty/959	5500
South Australia	Office of Consumer and Business Affairs	www.ocba.sa.gov.au	08 8204 9696
Tasmania	WorkCover Tasmania	www.workcover.tas.gov.au	1300 776 572
Tasmania	Workplace Standards Tasmania	http://www.wst.tas.gov.au/industries/gas	1300 135 513
Victoria	Energy Safe Victoria	www.esv.vic.gov.au	03 9203 9700
Western Australia	Department of Consumer and Employment Protection - Energy Safety	www.energysafety.wa.gov.au	08 9422 5282
Western Australia	Office of Energy	http://www.energy.wa.gov.au/2/3176/64/gas.pm	08 9420 5600

Other Bodies

Organisation	**Website**
Standards Australia	www.standards.org.au
Department of Education, Employment and workplace Relations	http://www.deewr.gov.au/
SafeWork Australia	http://safeworkaustralia.gov.au/
Training.gov.au	http://training.gov.au/

1.2.07 Maintenance of Competency Standards

2.7 Maintenance of Competency Standards

The ESI - Generation Industry competency standards were developed by, and are therefore owned by, the industry. However, it is acknowledged that copyright ownership with respect to this material rests with the Commonwealth.

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The competency standards must be maintained so that they reflect the ongoing needs of the ESI - Generation Industry and respond in a timely manner to changed technologies and circumstances.

The parties (as detailed in the Introduction to this Training Package) who constitute the ESI - Generation Industry sector of the ElectroComms and EnergyUtilities Industry Skills Council share responsibility for the maintenance of the Competency Standards:

- Competency Standards maintenance will be coordinated and managed by ElectroComms and EnergyUtilities Industry Skills Council Ltd trading as EE-Oz Training Standards or its successor.
- Suggestions and proposals for changes from all parties are welcomed. These should be documented and submitted to EE-Oz Training Standards in accordance with its policies and procedures.
-

1.2.08 What is Competency?

2.8 What is Competency?

The broad concept of industry competency concerns the ability to perform particular tasks and duties to the standard of performance expected in the workplace. Competency requires the application of specified skills, knowledge and attitudes relevant to effective participation in an industry, industry sector or enterprise.

Competency covers all aspects of workplace performance and involves performing individual tasks; managing a range of different tasks; responding to contingencies or breakdowns; and, dealing with the responsibilities of the workplace, including working with others. Workplace competency requires the ability to apply relevant skills, knowledge and attitudes consistently over time and in the required workplace situations and environments. In line with this concept of competency Training Packages focus on what is expected of a competent individual in the workplace as an outcome of learning, rather than focussing on the learning process itself.

Competency standards in Training Packages are determined by industry to meet identified industry skill needs. Competency standards are made up of a number of units of competency each of which describes a key function or role in a particular job function or occupation. Each unit of competency within a Training Package is linked to one or more AQF qualifications.

Contextualisation of Units of Competency by RTOs

Registered Training Organisations (RTOs) may contextualise units of competency in this endorsed Training Package to reflect required local outcomes. Contextualisation could involve additions or amendments to the unit of competency to suit particular delivery methods, learner profiles, specific enterprise equipment requirements, or to otherwise meet local needs. However, the integrity of the overall intended outcome of the unit of competency must be maintained.

Any contextualisation of units of competency in this Training Package must be within the bounds of the following advice:

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- RTOs must not remove or add to the number and content of elements and performance criteria.
- RTOs can include specific industry terminology in the range statement.
- Any amendments and additions to the range statement made by RTOs must not diminish the breadth of application of the competency, or reduce its portability.
- RTOs may add detail to the evidence guide in areas such as the critical aspects of evidence or required resources and infrastructure—but only where these expand the breadth of the competency and do not limit its use.
-

Components of Units of Competency

The components of units of competency are summarised below, in the order in which they appear in each unit of competency.

Unit Title

The unit title is a succinct statement of the outcome of the unit of competency. Each unit of competency title is unique, both within and across Training Packages.

Unit Descriptor

The unit descriptor broadly communicates the content of the unit of competency and the skill area it addresses. Where units of competency have been contextualised from units of competency from other endorsed Training Packages, summary information is provided. There may also be a brief second paragraph that describes its relationship with other units of competency, and any licensing requirements.

Employability Skills

This sub-section contains a statement that the unit contains Employability skills.

Pre-requisite Units (optional)

If there are any units of competency that must be completed before the unit, these will be listed.

Application of the Unit

This sub-section fleshes out the unit of competency's scope, purpose and operation in different contexts, for example, by showing how it applies in the workplace.

Competency Field (Optional)

The competency field either reflects the way the units of competency are categorised in the Training Package or denotes the industry sector, specialisation or function. It is an optional component of the unit of competency.

Sector (optional)

The industry sector is a further categorisation of the competency field and identifies the next classification, for example an elective or supervision field.

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Elements of Competency

The elements of competency are the basic building blocks of the unit of competency. They describe in terms of outcomes the significant functions and tasks that make up the competency.

Performance Criteria

The performance criteria specify the required performance in relevant tasks, roles, skills and in the applied knowledge that enables competent performance. They are usually written in passive voice. Critical terms or phrases may be written in bold italics and then defined in range statement, in the order of their appearance in the performance criteria.

Required Skills and Knowledge

The essential skills and knowledge are either identified separately or combined. Knowledge identifies what a person needs to know to perform the work in an informed and effective manner. Skills describe the application of knowledge to situations where understanding is converted into a workplace outcome.

Range Statement

The range statement provides a context for the unit of competency, describing essential operating conditions that may be present with training and assessment, depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts. As applicable, the meanings of key terms used in the performance criteria will also be explained in the range statement.

Evidence Guide

The evidence guide is critical in assessment as it provides information to the Registered Training Organisation (RTO) and assessor about how the described competency may be demonstrated. The evidence guide does this by providing a range of evidence for the assessor to make determinations, and by providing the assessment context. The evidence guide describes:

- conditions under which competency must be assessed including variables such as the assessment environment or necessary equipment;
- relationships with the assessment of any other units of competency;
- suitable methodologies for conducting assessment including the potential for workplace simulation;
- resource implications, for example access to particular equipment, infrastructure or situations;
- how consistency in performance can be assessed over time, various contexts and with a range of evidence; and
- the required underpinning knowledge and skills
-

Employability Skills in Units of Competency

The detail and application of Employability Skills facets will vary according to the job-role requirements of each industry. In developing Training Packages, industry stakeholders are consulted to identify appropriate facets of Employability Skills which are incorporated into the relevant units of competency and qualifications.

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Employability Skills are not a discrete requirement contained in units of competency (as was the case with Key Competencies). Employability Skills are specifically expressed in the context of the work outcomes described in units of competency and will appear in elements, performance criteria, range statements and evidence guides. As a result, users of Training Packages are required to review the entire unit of competency in order to accurately determine Employability Skills requirements.

How Employability Skills relate to the Key Competencies

The eight nationally agreed Employability Skills now replace the seven Key Competencies in Training Packages. Trainers and assessors who have used Training Packages prior to the introduction of Employability Skills may find the following comparison useful.

Employability Skills	**Mayer Key Competencies**
Communication	Communicating ideas and information
Teamwork	Working with others and in teams
Problem solving	Solving problems Using mathematical ideas and techniques
Initiative and enterprise	
Planning and organising	Collecting, analysing and organising information Planning and organising activities
Self-management	
Learning	
Technology	Using technology

When analysing the above table it is important to consider the relationship and natural overlap of Employability Skills. For example, using technology may involve communication skills and combine the understanding of mathematical concepts.

Explicitly embedding Employability Skills in units of competency

This Training Package seeks to ensure that industry-endorsed Employability Skills are explicitly embedded in units of competency. The application of each skill and the level of detail included in each part of the unit will vary according to industry requirements and the nature of the unit of competency.

Employability Skills must be both explicit and embedded within units of competency. This means that Employability Skills will be:

- embedded in units of competency as part of the other performance requirements that make up the competency as a whole
- explicitly described within units of competency to enable Training Packages users to identify accurately the performance requirements of each unit with regards to Employability Skills.

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This Training Package also seeks to ensure that Employability Skills are well-defined and written into units of competency so that they are apparent, clear and can be delivered and assessed as an essential component of unit work outcomes.

Sample unit of competency components showing Employability Skills

The following table shows the sequence of a unit of competency, and each cell contains text taken from a range of units. It provides examples of where and how various Employability Skills could be embedded in each component.

Please note that in the example, the bracketed Employability Skills are provided for clarification only and would not be present in units of competency within this Training Package.

Unit Title	**Give formal presentations and take part in meetings (Communication)**
Unit Descriptor	This unit covers the skills and knowledge required to promote the use and implementation of innovative work practices to effect change. (Initiative and enterprise)
Element	Proactively resolve issues. (problem solving)
Performance Criteria	Information is organised in a format suitable for analysis and dissemination in accordance with organisational requirements. (Planning and organising)
Range Statement	Software applications may include email, internet, word processing, spreadsheet, database or accounting packages. (technology)
Required Skills and Knowledge	Modify activities depending on differing workplace contexts, risk situations and environments. (Learning) Work collaboratively with others during a fire emergency. (teamwork) Instructions, procedures and other information relevant the maintenance of vessel and port security. (Communication)
Evidence Guide	Evidence of having worked constructively with a wide range of community groups and stakeholders to solve problems and adapt or design new solutions to meet identified needs in crime prevention. In particular, evidence must be obtained on the ability to: assess response options to identified crime-prevention needs and determine the optimal action to be implemented in consultation with relevant others, design an initiative to address identified issues. (Initiative and enterprise).

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Employability Skills Summaries and units of competency

An Employability Skills Summary exists for each qualification. Summaries include broad advice on industry expectations with regard to Employability Skills at the qualification level. Summaries should be used by trainers and assessors to assist in identifying the Employability Skills requirements contained within units of competency.

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1.2.09 Index of Competency Standard Units

2.9 Index of Competency Standard Units

Power Generation Operations AQF 2 Competency Standard Units

Unit Code	Unit Title	Wtg Pts	AQF Level	Prerequisite/s	Qualification Core	Qualification Elective
UEPOPS202B	Apply Quality Systems To Work	20	2	Nil	UEP20112; UEP30112; UEP30212; UEP40112; UEP40212; UEP40312; UEP40412; UEP50112; UEP50212	UEP40512
UEPOPS203B	Operate and Monitor Communications Systems	20	2	Nil		UEP20112; UEP30112; UEP30212; UEP40112; UEP40212
UEPOPS204B	Maintain and Utilise Records	20	2	Nil	UEP20112; UEP30212; UEP30112	
UEPOPS205B	Conduct Minor Mechanical Maintenance	40	2	Nil		UEP20112;

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Unit Code	Unit Title	Wtg Pts	AQF Level	Prerequisite/s	Qualification Core	Qualification Elective
						UEP30212; UEP30112
UEPOPS206B	Conduct Minor Electrical Maintenance	40	2	Nil		UEP20112; UEP30212; UEP30112
UEPOPS207B	Perform Plant Lubrication	20	2	Nil		UEP20112; UEP30212; UEP30112
UEPOPS209B	Perform Process Plant Inspections	30	2	Nil	UEP20112; UEP30212; UEP30112	
UEPOPS210B	Conduct First Response within a Workplace Team	30	2	Nil		UEP20112
UEPOPS211B	Clean Plant and Equipment	20	2	Nil		UEP20112; UEP30212; UEP30112
UEPOPS232B	Transport Plant and Equipment	20	2	UEENEEE101A		UEP20112
UEPOPS237B	Perform Tool Store Duties	20	2	Nil		UEP20112
UEPOPS238B	Maintain Battery Banks and Cells	30	2	Nil		UEP20112

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Unit Code	Unit Title	Wtg Pts	AQF Level	Prerequisite/s	Qualification Core	Qualification Elective
UEPOPS240B	Operate and Monitor Fuel Supply (Coal)	40	2	Nil		UEP20112
UEPOPS241B	Operate and Monitor Ash and Dust Disposal Plant	40	2	Nil		UEP20112
UEPOPS242B	Operate and Monitor Dust Collection Plant	40	2	Nil		UEP20112
UEPOPS243B	Operate Air Conditioning Plant	30	2	Nil		UEP20112
UEPOPS244B	Operate and Monitor Site Services Water Systems	30	2	Nil		UEP20112
UEPOPS245B	Conduct Chemical Batching Operations	30	2	Nil		UEP20112
UEPOPS246B	Operate Waste and Contaminated Water Plant	30	2	Nil		UEP20112
UEPOPS247B	Operate and Monitor an Internal Combustion Single Fuel Reciprocating Engine	40	2	Nil		UEP20112
UEPOPS248B	Operate and Monitor an Internal Combustion Dual Fuel Reciprocating Engine	40	2	Nil		UEP20112

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Unit Code	Unit Title	Wtg Pts	AQF Level	Prerequisite/s	Qualification Core	Qualification Elective
UEPOPS249B	Liaise with Stakeholders	20	2	Nil	UEP30212; UEP30112	UEP20112
UEPOPS251A	Conduct Routine Wind Turbine Maintenance	40	2	Nil		UEP20112
UEPOPS252A	Undertake Local Systems Operations	30	2	Nil	UEP20112; UEP30212; UEP30112; UEP40112; UEP40212	

Power Generation Operations AQF 3 Competency Standard Units

Unit Code	Unit Title	Wtg Pts	AQF Level	Prerequisite/s	Qualification Core	Qualification Elective
UEPOPS301B	Conduct Single Energy Source Isolation Procedures for Permit to Work	40	3	UEENEEE101A	UEP30112; UEP30212; UEP40112; UEP40212; UEP50212	UEP50412; UEP50312; UEP50112; UEP40512; UEP40412; UEP40312; UEP40612

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Unit Code	Unit Title	Wtg Pts	AQF Level	Prerequisite/s	Qualification Core	Qualification Elective
UEPOPS304B	Make and Spread a Stockpile	40	3	UEENEEE101A		UEP30112; UEP30212; UEP40112; UEP40212; UEP50112; UEP50212
UEPOPS305B	Operate & Monitor Briquette Coal Cooling Plant	40	3	UEENEEE101A		UEP30112; UEP30212; UEP40112; UEP40212; UEP50112; UEP50212
UEPOPS306B	Operate & Monitor Briquette Coal Drying Plant	40	3	UEENEEE101A		UEP30112; UEP30212; UEP40112; UEP40212; UEP50112; UEP50212
UEPOPS307B	Operate & Monitor Briquette Coal Press Plant	40	3	UEENEEE101A		UEP30112; UEP30212; UEP40112; UEP40212; UEP50112; UEP50212
UEPOPS308B	Perform Briquette Laboratory Tests	40	3	UEENEEE101A		UEP30112; UEP30212; UEP40112; UEP40212; UEP50112; UEP50212
UEPOPS309B	Operate and Monitor Air Conditioning Equipment and Ventilation Systems	20	3	Nil		UEP30112; UEP30212; UEP40112; UEP40212; UEP50112; UEP50212
UEPOPS310B	Operate Bulk Coal Handling Plant	40	3	Nil		UEP30112; UEP30212; UEP40112; UEP40212; UEP50112; UEP50212

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Unit Code	Unit Title	Wtg Pts	AQF Level	Prerequisite/s	Qualification Core	Qualification Elective
UEPOPS311B	Operate Fabric Filter Dust Collection Plant	20	3	Nil		UEP30112; UEP30212; UEP40112; UEP40212; UEP50112; UEP50212
UEPOPS312B	Operate and Monitor Fuel Supply	20	3	Nil		UEP30112; UEP30212; UEP40112; UEP40212; UEP50112; UEP50212
UEPOPS313B	Operate and Monitor Boiler Draught System	40	3	Nil		UEP30112; UEP30212; UEP40112; UEP40212; UEP50112; UEP50212
UEPOPS314B	Operate and Monitor Fuel Firing Plant (Gas or Oil)	40	3	Nil		UEP30112; UEP30212; UEP40112; UEP40212; UEP50112; UEP50212
UEPOPS315B	Operate and Monitor Fuel Firing Plant (Coal)	40	3	Nil		UEP30112; UEP30212; UEP40112; UEP40212; UEP50112; UEP50212
UEPOPS316B	Operate and Monitor Boiler Steam/Water Cycle	40	3	Nil		UEP30112; UEP30212; UEP40112; UEP40212; UEP50112; UEP50212
UEPOPS317B	Operate and Monitor Fixed Fire Protection Systems	30	3	Nil	UEP30112	UEP30212; UEP40112; UEP40212; UEP50112;

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Unit Code	Unit Title	Wtg Pts	AQF Level	Prerequisite/s	Qualification Core	Qualification Elective
						UEP50212
UEPOPS318B	Operate and Monitor Compressed Gas Systems	30	3	Nil		UEP30112; UEP30212; UEP40112; UEP40212; UEP50112; UEP50212
UEPOPS319B	Operate and Monitor Gas Production Plant	30	3	Nil		UEP30112; UEP30212; UEP40112; UEP40212; UEP50112; UEP50212
UEPOPS320B	Operate and Monitor Compressed Air Systems	30	3	Nil		UEP30112; UEP30212; UEP40112; UEP40212; UEP50112; UEP50212
UEPOPS321B	Operate and Monitor Water Treatment Plant	30	3	Nil		UEP30112; UEP30212; UEP40112; UEP40212; UEP50112; UEP50212
UEPOPS322B	Operate and Monitor Alkalinity Reduction Plant	30	3	Nil		UEP30112; UEP30212; UEP40112; UEP40212; UEP50112; UEP50212
UEPOPS323B	Operate and Monitor Reverse Osmosis Plant	30	3	Nil		UEP30112; UEP30212; UEP40112; UEP40212; UEP50112; UEP50212
UEPOPS324B	Operate and Monitor Brine Concentrator Plant	30	3	Nil		UEP30112; UEP30212; UEP40112; UEP40212;

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Unit Code	Unit Title	Wtg Pts	AQF Level	Prerequisite/s	Qualification Core	Qualification Elective
						UEP50112; UEP50212
UEPOPS325B	Operate and Monitor Water Quality Control Systems	30	3	Nil		UEP30112; UEP30212; UEP40112; UEP40212; UEP50112; UEP50212
UEPOPS326B	Operate and Monitor Oil Systems	30	3	Nil		UEP30112; UEP30212; UEP40112; UEP40212; UEP50112; UEP50212
UEPOPS327B	Monitor and Maintain Civil Assets	30	3	Nil		UEP30112; UEP30212; UEP40112; UEP40212; UEP50112; UEP50212
UEPOPS328B	Undertake Dam Safety Surveillance	30	3	Nil		UEP30112; UEP30212; UEP40112; UEP40212; UEP50112; UEP50212
UEPOPS329B	Operate and Monitor Auxiliary Steam Systems	40	3	Nil		UEP30112; UEP30212; UEP40112; UEP40212; UEP50112; UEP50212
UEPOPS330B	Operate and Monitor Heat Exchangers	40	3	Nil		UEP30112; UEP30212; UEP40112; UEP40212; UEP50112; UEP50212
UEPOPS331B	Operate and Monitor Water Systems (Condensate & Feedwater)	40	3	Nil		UEP30112; UEP30212; UEP40112; UEP40212;

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Unit Code	Unit Title	Wtg Pts	AQF Level	Prerequisite/s	Qualification Core	Qualification Elective
						UEP50112; UEP50212
UEPOPS332B	Operate and Monitor Condensing and Cooling Water System	40	3	Nil		UEP30112; UEP30212; UEP40112; UEP40212; UEP50112; UEP50212
UEPOPS333B	Operate and Monitor H.R.S.G. Hot Gas Control System	40	3	Nil		UEP30112; UEP30212; UEP40112; UEP40212; UEP50112; UEP50212
UEPOPS334B	Operate and Monitor a Wind Generator	60	3	Nil		UEP30112; UEP30212; UEP40112; UEP40212; UEP50112; UEP50212
UEPOPS335B	Operate A Hydro Generator/Synchronous Condenser / Pump Unit	60	3	Nil		UEP30112; UEP30212; UEP40112; UEP40212; UEP50112; UEP50212
UEPOPS336B	Manage Operate and Monitor a Gas Turbine Unit	60	3	Nil		UEP30112; UEP30212; UEP40112; UEP40212; UEP50112; UEP50212
UEPOPS337B	Maintain Quality Systems within the Team	20	3	UEPOPS202B	UEP40112; UEP40212; UEP50112; UEP50212; UEP40312; UEP40412; UEP50412; UEP50312	UEP30112; UEP30212; UEP40512

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Unit Code	Unit Title	Wtg Pts	AQF Level	Prerequisite/s	Qualification Core	Qualification Elective
UEPOPS338B	Facilitate Effective Workplace Communication	20	3	Nil	UEP40312; UEP40512; UEP50112; UEP50312; UEP50412	UEP30112; UEP30212; UEP40112; UEP40212; UEP40412; UEP50112; UEP50212
UEPOPS339B	Operate and Monitor a Boiler Unit	60	3	Nil		UEP30112; UEP30212; UEP40112; UEP40212; UEP50112; UEP50212
UEPOPS340B	Operate and Monitor a Steam Turbine	60	3	Nil		UEP30112; UEP30212; UEP40112; UEP40212; UEP50112; UEP50212
UEPOPS342B	Interpret and Analyse Single Operation Protection Devices	60	3	Nil	UEP30112; UEP40112; UEP40212; UEP50212	UEP30212; UEP50112
UEPOPS343B	Operate Hydro-Electric Generating Plant and Auxiliary Equipment	60	3	Nil		UEP30112; UEP30212; UEP40112; UEP40212; UEP50112; UEP50212
UEPOPS344B	Conduct Water Conveyance and Control	30	3	Nil		UEP30112; UEP30212; UEP40112; UEP40212; UEP50112; UEP50212
UEPOPS345B	Implement Dam Safety Surveillance Procedures	30	3	Nil		UEP30112; UEP30212; UEP40112; UEP40212; UEP50112; UEP50212

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Unit Code	Unit Title	Wtg Pts	AQF Level	Prerequisite/s	Qualification Core	Qualification Elective
UEPOPS346B	Conduct Non-Routine Operational Testing	60	3	Nil		UEP30112; UEP30212; UEP40112; UEP40212; UEP50112; UEP50212
UEPOPS347B	Operate and Monitor Supervisory, Control and Data Acquisition Systems	40	3	Nil	UEP30112; UEP40112; UEP40212	UEP30212 UEP50112; UEP50212
UEPOPS349B	Operate local H.V. Switchgear	40	3	Nil		UEP30112; UEP30212; UEP40112; UEP40212; UEP50112; UEP50212
UEPOPS351B	Operate H.V. Condition Changing Apparatus	60	3	Nil		UEP30112; UEP30212; UEP40112; UEP40212; UEP50112; UEP50212
UEPOPS352B	Conduct Operational Checks on In-Service Mechanical Plant	40	3	UEENEEE101A	UEP30212;	UEP30112; UEP40112; UEP40212; UEP50112; UEP50212
UEPOPS354B	Operate and Monitor Dual Fuel-Firing Plant	80	3	Nil		UEP30112; UEP30212; UEP40112; UEP40212; UEP50112; UEP50212
UEPOPS355B	Monitor the Implementation of Under Frequency Load Shedding	60	3	Nil		UEP30112; UEP30212; UEP40112; UEP40212; UEP50112; UEP50212

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Unit Code	Unit Title	Wtg Pts	AQF Level	Prerequisite/s	Qualification Core	Qualification Elective
UEPOPS356B	Apply Environmental and Sustainable Energy Procedures	20	3	Nil	UEP20112; UEP30112; UEP30212; UEP50112	UEP40112; UEP40212; UEP50212
UEPOPS357B	Operate H.V. Secondary Switchgear	40	3	Nil		UEP30112; UEP30212; UEP40112; UEP40212; UEP50112; UEP50212
UEPOPS358A	Monitor and Maintain Wind Farm Civil Assets	40	3	Nil		UEP30112; UEP30212; UEP40112; UEP40212; UEP50112; UEP50212
UEPOPS359A	Monitor Climatic Conditions for Renewable Energy Production	40	3	Nil		UEP30112; UEP30212; UEP40112; UEP40212; UEP50112; UEP50212
UEPOPS360A	Operate and Monitor a Hydro Turbine	60	3	Nil		UEP30112; UEP30212; UEP40112; UEP40212; UEP50112; UEP50212
UEPOPS361A	Operate and Monitor Hydro Plant Auxiliary Systems	60	3	Nil		UEP30112; UEP30212; UEP40112; UEP40212; UEP50112; UEP50212
UEPOPS362A	Operate and Monitor Generator/Alternator	60	3	Nil		UEP30112; UEP30212; UEP40112; UEP40212; UEP50112; UEP50212

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Unit Code	Unit Title	Wtg Pts	AQF Level	Prerequisite/s	Qualification Core	Qualification Elective
UEPOPS364A	Ensure Compliance with Occupational Health and Safety policy and procedures	20	3	UEENEEE101A	UEP30112; UEP30212	UEP40112; UEP40212; UEP50112; UEP50212
UEPOPS368A	Operate manual systems	30	3	UEPOPS252A		UEP30112; UEP30212; UEP40112; UEP40212; UEP50112; UEP50212
UEPOPS369A	Respond to a critical incident	40	3	Nil	UEP30212; UEP40112; UEP50112	UEP30112; UEP40212; UEP50212
UEPOPS370A	Facilitate the use of contingency plans	60	3	Nil	UEP50112	UEP30112; UEP30212; UEP40112; UEP40212; UEP50212
UEPOPS371A	Carry out operational checks on in-service electrical plant	40	3	Nil	UEP30212; UEP40212; UEP40512 UEP50412	UEP30112; UEP40112; UEP40212; UEP50112; UEP50212

Power Generation Operations AQF 4 Competency Standard Units

Unit Code	Unit Title	Wtg Pts	AQF Level	Prerequisite/s	Qualification Core	Qualification Elective

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Unit Code	Unit Title	Wtg Pts	AQF Level	Prerequisite/s	Qualification Core	Qualification Elective
UEPOPS402B	Conduct Multiple Energy Source Isolation Procedures for Permit to Work	40	4	UEPOPS301B UEENEEE101A	UEP40212; UEP50212	UEP40112; UEP40312; UEP40412; UEP40512; UEP40612 UEP50112; UEP50312; UEP50412
UEPOPS403B	Coordinate Permit to Work System	40	4	UEPOPS402B UEENEEE101A	UEP40212; UEP50212	UEP40112; UEP50112
UEPOPS404B	Coordinate First Response Team Operation	20	4	UEPOPS210B		UEP40112; UEP40212; UEP50112; UEP50212;
UEPOPS405B	Operate and Monitor AC Electrical Systems	30	4	Nil	UEP40212	UEP40112; UEP50112; UEP50212
UEPOPS406B	Operate and Monitor DC Electrical Systems	30	4	Nil	UEP40212; UEP50212	UEP40112; UEP50112

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Unit Code	Unit Title	Wtg Pts	AQF Level	Prerequisite/s	Qualification Core	Qualification Elective
UEPOPS407B	Start and Run Up A Gas Turbine	60	4	Nil		UEP40112; UEP40212; UEP50112; UEP50212
UEPOPS408B	Shut Down a Gas Turbine	60	4	Nil		UEP40112; UEP40212; UEP50112; UEP50212
UEPOPS409B	Start-Up A Boiler Unit	60	4	Nil		UEP40112; UEP40212; UEP50112; UEP50212
UEPOPS410B	Shut Down A Boiler Unit	60	4	Nil		UEP40112; UEP40212; UEP50112; UEP50212
UEPOPS411B	Run Up A Steam Turbine	60	4	Nil		UEP40112; UEP40212; UEP50112; UEP50212
UEPOPS412B	Undertake Operations Commissioning /	30	4	Nil		UEP40112; UEP40212;

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Unit Code	Unit Title	Wtg Pts	AQF Level	Prerequisite/s	Qualification Core	Qualification Elective
	Decommissioning					UEP50112; UEP50212
UEPOPS413B	Coordinate Operational Strategies for Power Production	20	4	Nil		UEP40112; UEP40212; UEP50112; UEP50212
UEPOPS414B	Perform Risk Analysis of Generation Plant	20	4	Nil		UEP40112; UEP40212; UEP50112; UEP50212
UEPOPS416B	Monitor the Implementation of the Enterprise's Production / Maintenance Quality Control procedures	20	4	UEPOPS338B	UEP50312	UEP40112; UEP40212; UEP50112; UEP50212
UEPOPS417B	Monitor and Implement Environmental Plans and Procedures	20	4	Nil	UEP40112; UEP40212; UEP40312; UEP40412; UEP40512; UEP50112; UEP50212; UEP50312; UEP50412	
UEPOPS419B	Shut down a steam turbine	60	4	Nil		UEP40112; UEP40212; UEP50112;

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Unit Code	Unit Title	Wtg Pts	AQF Level	Prerequisite/s	Qualification Core	Qualification Elective
						UEP50212
UEPOPS420B	Coordinate the Network/System	40	4	Nil	UEP40112; UEP50112	UEP40212; UEP50212
UEPOPS422B	Schedule Generation	40	4	Nil		UEP40112; UEP40212; UEP50112; UEP50212
UEPOPS423B	Plan a Scheduled Outage	40	4	Nil	UEP40112	UEP40212; UEP50112; UEP50212
UEPOPS424B	Coordinate Local H.V. Networks	40	4	Nil		UEP40112; UEP40212; UEP50112; UEP50212
UEPOPS425B	Produce Maintenance Plans For Generation Production Plant	40	4	Nil		UEP40112; UEP40212; UEP50112; UEP50212
UEPOPS426B	Interpret and Analyse Multi-Operation Protection Devices	40	4	UEPOPS342B	UEP40112; UEP40212; UEP50112; UEP50212	

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Unit Code	Unit Title	Wtg Pts	AQF Level	Prerequisite/s	Qualification Core	Qualification Elective
UEPOPS428B	Develop H.V. Switching Programs	40	4	Nil	UEP40112; UEP50112	UEP40212; UEP50212
UEPOPS430B	Control Permit to Work Operations	30	4	Nil	UEP50412; UEP50312; UEP40512; UEP40412; UEP40312	UEP40112; UEP40212; UEP50112; UEP50212
UEPOPS431B	Collect and Analyse Hydrological and Meteorological Data	20	4	UEPOPS209B		UEP40112; UEP40212; UEP50112; UEP50212
UEPOPS432B	Start up a Heat Recovery Steam Generator Unit	30	4	UEPOPS333B		UEP40112; UEP40212; UEP50112; UEP50212
UEPOPS433B	Operate and Monitor a Heat Recovery Steam Generator Unit	20	4	UEPOPS333B; UEPOPS407B; UEPOPS432B		UEP40112; UEP40212; UEP50112; UEP50212
UEPOPS434B	Shutdown an Heat Recovery Steam Generator Unit	30	4	UEPOPS333B; UEPOPS408B		UEP40112; UEP40212; UEP50112; UEP50212

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Unit Code	Unit Title	Wtg Pts	AQF Level	Prerequisite/s	Qualification Core	Qualification Elective
UEPOPS435B	Operate and Monitor Flue Gas NOx Mitigation Systems	30	4	Nil		UEP40112; UEP40212; UEP50112; UEP50212
UEPOPS437B	Manage System Re-Start	40	4	Nil		UEP40112; UEP40212; UEP50112; UEP50212;
UEPOPS439B	Plan and Organise Work	30	4	Nil	UEP40112; UEP40212; UEP40312; UEP40412; UEP50212; UEP50312; UEP50412	UEP50112; UEP40512
UEPOPS440B	Co-ordinate Team Activities	30	4	Nil	UEP40112; UEP40212; UEP50112; UEP50212; UEP50312	UEP50412
UEPOPS441B	Operate and Monitor System Equipment	30	4	Nil	UEP50112	UEP40112; UEP40212; UEP50212
UEPOPS442B	Monitor and Co-ordinate the Operation of a Combined Cycle	60	4	UEPOPS314B; UEPOPS333B; UEPOPS336B;		UEP40112; UEP40212; UEP50112;

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Unit Code	Unit Title	Wtg Pts	AQF Level	Prerequisite/s	Qualification Core	Qualification Elective
	Gas Turbine Unit			UEPOPS342B		UEP50212
UEPOPS443A	Coordinate Wind Farm Operations	40	4	Nil		UEP40112; UEP40212; UEP50112; UEP50212
UEPOPS444A	Start and Run-up a Hydro Turbine	60	4	Nil		UEP40112; UEP40212; UEP50112; UEP50212
UEPOPS445A	Shut Down a Hydro Turbine	60	4	Nil		UEP40112; UEP40212; UEP50112; UEP50212
UEPOPS446A	Operate and monitor hydro unit control and protection systems	80	4	Nil		UEP40112; UEP40212; UEP50112; UEP50212
UEPOPS447A	Coordinate photovoltaic solar power plant operations	60	4	Nil		UEP40112; UEP40212; UEP50112; UEP50212

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Unit Code	Unit Title	Wtg Pts	AQF Level	Prerequisite/s	Qualification Core	Qualification Elective
UEPOPS450A	Coordinate effective workplace communication	40	4	UEPOPS338B		UEP40112; UEP40212; UEP50112; UEP50212
UEPOPS451A	Coordinate the use of contingency plans	40	4	UEPOPS370A		UEP40112; UEP40212; UEP50112; UEP50212
UEPOPS452A	Conduct operational checks and carry out corrective action on in-service electrical plant	40	4	Nil		UEP40112; UEP40212; UEP50112; UEP50212
UEPOPS454A	Coordinate response to critical incidents	30	4	UEPOPS369A	UEP40212; UEP50112; UEP50212	UEP40112
UEPOPS456A	Perform switching to a switching program	30	4	Nil	UEP50112	UEP40112; UEP40212; UEP50212
UEPOPS457A	Control electrical energy production	40	4	Nil	UEP50212	UEP40112; UEP40212; UEP50112

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Power Generation Operations AQF 5 Competency Standard Units

Unit Code	Unit Title	Wtg Pts	AQF Level	Prerequisite/s	Qualification Core	Qualification Elective
UEPOPS501B	Manage Occupational Health and Safety Policy and Procedures	40	5	UEENEEE117A	UEP50112; UEP50212; UEP50312; UEP50412	
UEPOPS502B	Manage Permit to Work System	40	5	UEPOPS403B UEPOPS402B UEENEEE101A	UEP50212	UEP50112; UEP50312
UEPOPS505B	Produce maintenance strategies for generation production plant	80	5	UEPOPS425B	UEP50312	UEP50112; UEP50212
UEPOPS507B	Conduct project management	60	5	Nil	UEP50412; UEP50312	UEP50112; UEP50212
UEPOPS508B	Manage commissioning/ decommissioning	80	5	Nil		UEP50112; UEP50212; UEP50312; UEP50412
UEPOPS509B	Manage quality control procedures	40	5	Nil	UEP50412; UEP50212	UEP50112; UEP50312
UEPOPS510B	Monitor power generation plant reliability	60	5	Nil		UEP50112; UEP50212; UEP50312

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Unit Code	Unit Title	Wtg Pts	AQF Level	Prerequisite/s	Qualification Core	Qualification Elective
UEPOPS511B	Tune Process Plant and Equipment	60	5	Nil		UEP50112; UEP50212; UEP50312; UEP50412;
UEPOPS512B	Manage the Network/System	80	5	UEPOPS420B	UEP50112	UEP50212; UEP50312
UEPOPS513B	Manage Operational Crisis to Maintain/Restore Power System Integrity	60	5	Nil	UEP50112; UEP50212	UEP50312
UEPOPS514B	Control hydro generation/pumping	60	5	Nil		UEP50112; UEP50212
UEPOPS515B	Coordinate power generation	40	5	Nil	UEP50112	UEP50212; UEP50312
UEPOPS520A	Evaluate cost estimations and initiate appropriate solutions	40	5	UEENEEC005B		UEP50112; UEP50212; UEP50312
UEPOPS523A	Manage critical incidents	60	5	UEPOPS369A UEPOPS454B		UEP50112; UEP50212; UEP50312
UEPOPS524A	Evaluate the scheduling of generation	60	5	UEPOPS422B		UEP50112; UEP50212; UEP50312
UEPOPS525A	Coordinate and direct switching program	60	5	UEPOPS456A		UEP50112; UEP50212; UEP50312

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Unit Code	Unit Title	Wtg Pts	AQF Level	Prerequisite/s	Qualification Core	Qualification Elective
UEPOPS526A	Coordinate electrical energy production	60	5	UEPOPS457A		UEP50112; UEP50212; UEP50312
UEPOPS527A	Manage first response team	40	5	UEPOPS404B UEPOPS210B		UEP50112; UEP50212; UEP50312
UEPOPS528A	Manage environmental management systems	40	5	UEPOPS417B		UEP50112; UEP50212; UEP50312
UEPOPS529A	Manage operational strategies for power production	80	5	Nil		UEP50112; UEP50212; UEP50312

Power Generation Maintenance AQF 2 Competency Standard Units

Unit Code	Unit Title	Wtg Pts	AQF Level	Prerequisite/s	Qualification Core	Qualification Elective
UEPMNT201A	Carry out routine work activities in an electricity supply industry generation industry	40	2	UEENEEE101A		UEP20112
UEPMNT202A	Carry out work in an ESI large scale wind generation environment	20	2	UEENEEE101A	UEP40612	

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Power Generation Maintenance AQF 3 Competency Standard Units

Unit Code	Unit Title	Wtg Pts	AQF Level	Prerequisite/s	Qualification Core	Qualification Elective
UEPMNT302B	Install and Maintain Industrial Pipework	40	3	MEM18006C; MEM9002B; MEM12023A; MEM18001C; MEM18002B; MEM18003C; MEM18055B	UEP40412	UEP40312; UEP50312
UEPMNT303B	Maintain Mechanical Valves	40	3	MEM18006C; MEM9002B; MEM12023A; MEM18001C; MEM18002B; MEM18003C; MEM18055B		UEP40312;; UEP50312
UEPMNT304B	Maintain Mechanical Pumps	40	3	MEM18006C; MEM9002B; MEM12023A; MEM18001C; MEM18002B; MEM18003C; MEM18055B		UEP40312; UEP50312;
UEPMNT305B	Maintain Industrial Fans	40	3	MEM18006C; MEM9002B; MEM12023A; MEM18001C; MEM18002B; MEM18003C; MEM18055B		UEP40312; UEP50312
UEPMNT307B	Maintain Industrial Screens, Strainers and Filters	20	3	MEM18006C; MEM9002B; MEM12023A; MEM18001C; MEM18002B; MEM18003C; MEM18055B		UEP40312; UEP50312
UEPMNT308B	Maintain Conveyors and Associated Equipment	40	3	MEM18006C; MEM9002B; MEM12023A; MEM18001C; MEM18002B; MEM18003C; MEM18055B		UEP40312; UEP50312
UEPMNT309B	Maintain Material Feeders	40	3	MEM18006C; MEM9002B; MEM12023A; MEM18001C; MEM18002B; MEM18003C;		UEP40312; UEP50312

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Unit Code	Unit Title	Wtg Pts	AQF Level	Prerequisite/s	Qualification Core	Qualification Elective
				MEM18055B		
UEPMNT310B	Maintain Material Crushers	40	3	MEM18006C; MEM9002B; MEM12023A; MEM18001C; MEM18002B; MEM18003C; MEM18055B		UEP40312; UEP50312
UEPMNT311B	Maintain Fuel Transport Equipment	80	3	MEM18006C; MEM9002B; MEM12023A; MEM18001C; MEM18002B; MEM18003C; MEM18055B		UEP40312; UEP50312
UEPMNT312B	Maintain Industrial Pressure Vessels	80	3	MEM18006C; MEM9002B; MEM12023A; MEM18001C; MEM18002B; MEM18003C; MEM18055B		UEP40312; UEP50312
UEPMNT313B	Maintain Internal Combustion Engines	100	3	MEM18006C; MEM9002B; MEM12023A; MEM18001C; MEM18002B; MEM18003C; MEM18055B		UEP40312; UEP50312;
UEPMNT314B	Maintain Hydro Turbines	100	3	Nil		UEP40312; UEP50312
UEPMNT315B	Maintain Wind Turbines	100	3	Nil		UEP40312;; UEP50312; UEP50412
UEPMNT317B	Diagnose and Repair Faults in Mechanical Equipment	40	3	MEM18006C; MEM9002B; MEM12023A; MEM18001C; MEM18002B; MEM18003C; MEM18055B		UEP40312; UEP50312

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Unit Code	Unit Title	Wtg Pts	AQF Level	Prerequisite/s	Qualification Core	Qualification Elective
UEPMNT318B	Conduct Generator Mechanical Maintenance	80	3	MEM18006C; MEM9002B; MEM12023A; MEM18001C; MEM18002B; MEM18003C; MEM18055B		UEP40312;; UEP50312
UEPMNT319B	Maintain and Test Fixed Fire Protection Systems	20	3	UEENEEG108A; UEENEEE101A; UEENEEE102A; UEENEEE104A; UEENEEE105A; UEENEEE107A; UEENEEG006A; UEENEEG033A; UEENEEG063A; UEENEEG101A; UEENEEG102A; UEENEEG106A		UEP40512; UEP50412
UEPMNT320B	Inspect and Repair/Replace Faults in Mechanical Equipment/Components	40	3	MEM18006C; MEM9002B; MEM12023A; MEM18001C; MEM18002B; MEM18003C; MEM18055B		UEP40312
UEPMNT339B	Perform sheet metal work	60	3	MEM18006C; MEM9002B; MEM12023A; MEM18001C; MEM18002B; MEM18003C; MEM18055B		UEP40312; UEP40412
UEPMNT340B	Fabricate metal structures and components	40	3	MEM18006C; MEM9002B; MEM12023A; MEM18001C; MEM18002B; MEM18003C; MEM18055B		UEP40312; UEP40412
UEPMNT345B	Install electronic equipment	40	3	UEENEEE101A; UEENEEE102A; UEENEEE104A; UEENEEE105A; UEENEEE107A; UEENEEE137A; UEENEEG006A; UEENEEG033A;		UEP40512; UEP50412

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Unit Code	Unit Title	Wtg Pts	AQF Level	Prerequisite/s	Qualification Core	Qualification Elective
				UEENEEG063A; UEENEEG101A; UEENEEG102A; UEENEEG106A; UEENEEG108A; UEENEEG109A		
UEPMNT346B	Maintain electrical equipment	40	3	UEENEEG108A; UEENEEE101A; UEENEEE102A; UEENEEE104A; UEENEEE105A; UEENEEE107A; UEENEEG006A; UEENEEG033A; UEENEEG063A; UEENEEG101A; UEENEEG102A; UEENEEG106A		UEP40512; UEP50412
UEPMNT347B	Maintain complex electrical equipment	60	3	UEPMNT346A		UEP40512; UEP50412
UEPMNT348B	Maintain electrical electronic equipment	40	3	UEENEEG108A; UEENEEE101A; UEENEEE102A; UEENEEE104A; UEENEEE105A; UEENEEE107A; UEENEEG006A; UEENEEG033A; UEENEEG063A; UEENEEG101A; UEENEEG102A; UEENEEG106A		UEP40512; UEP50412
UEPMNT350B	Modify electrical equipment	40	3	UEENEEG108A; UEENEEE101A; UEENEEE102A; UEENEEE104A; UEENEEE105A; UEENEEE107A; UEENEEG006A; UEENEEG033A; UEENEEG063A; UEENEEG101A;		UEP40512; UEP50412

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Unit Code	Unit Title	Wtg Pts	AQF Level	Prerequisite/s	Qualification Core	Qualification Elective
				UEENEEG102A; UEENEEG106A		
UEPMNT351B	Test and commission electrical equipment	40	3	UEENEEG108A; UEENEEE101A; UEENEEE102A; UEENEEE104A; UEENEEE105A; UEENEEE107A; UEENEEG006A; UEENEEG033A; UEENEEG063A; UEENEEG101A; UEENEEG102A; UEENEEG106A		UEP40512; UEP50412
UEPMNT352B	Test and commission electronic electrical equipment	40	3	UEENEEG108A; UEENEEE101A; UEENEEE102A; UEENEEE104A; UEENEEE105A; UEENEEE107A; UEENEEG006A; UEENEEG033A; UEENEEG063A; UEENEEG101A; UEENEEG102A; UEENEEG106A		UEP40512; UEP50412
UEPMNT355B	Install complex electronic/ instrumentation equipment	40	3	UEENEEI108A; UEENEEI101A; UEENEEE102A; UEENEEE105A; UEENEEE107A		UEP40512; UEP50412
UEPMNT356B	Maintain instrumentation equipment	40	3	UEENEEI101A; UEENEEE102A; UEENEEE105A; UEENEEE107A		UEP40512; UEP50412
UEPMNT357B	Diagnose and repair faults in	60	3	UEENEEI101A;		UEP40512;

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Unit Code	Unit Title	Wtg Pts	AQF Level	Prerequisite/s	Qualification Core	Qualification Elective
	instrumentation equipment			UEENEEE102A; UEENEEE105A; UEENEEE107A		UEP50412
UEPMNT358B	Modify instrumentation equipment	40	3	UEENEEI101A; UEENEEE102A; UEENEEE105A; UEENEEE107A		UEP40512; UEP50412
UEPMNT359B	Test and Commission Instrumentation Systems	40	3	UEENEEI101A; UEENEEE102A; UEENEEE105A; UEENEEE107A		UEP40512; UEP50412
UEPMNT361A	Maintain Wind Turbine Mechanical Systems	60	3			UEP50412
UEPMNT362A	Maintain Wind Turbine Control Systems	60	3	UEENEEG108A; UEENEEE101A; UEENEEE102A; UEENEEE104A; UEENEEE105A; UEENEEE107A; UEENEEG006A; UEENEEG033A; UEENEEG063A; UEENEEG101A; UEENEEG102A; UEENEEG106A		UEP40512; UEP50412
UEPMNT366A	Maintain power plant inverter systems	60	3	UEENEEG108A; UEENEEE101A; UEENEEE102A; UEENEEE104A; UEENEEE105A; UEENEEE107A; UEENEEG006A; UEENEEG033A; UEENEEG063A; UEENEEG101A; UEENEEG102A; UEENEEG106A		UEP40512; UEP50412

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Unit Code	Unit Title	Wtg Pts	AQF Level	Prerequisite/s	Qualification Core	Qualification Elective
UEPMNT367A	Install and commission stationary gas fuelled reciprocating engines	60	3	UEENEEE101A Or CPCCOHS1001A and HLTCPR201A		UEP40312
UEPMNT368A	Repair and maintain stationary gas fuelled reciprocating engines	60	3	UEENEEE101A Or CPCCOHS1001A and HLTCPR201A		UEP40312
UEPMNT369A	Monitor Climatic Conditions for Renewable Energy Power Generation	40	3	UEENEEE101A		UEP40612
UEPMNT370A	Maintain and monitor wind farm civil assets	40	3	UEENEEE101A; UEENEEE102A; UEENEEK142A		UEP40612
UEPMNT371A	Maintain large scale wind turbine generators	60	3	UEENEEE101A	UEP40612	

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Power Generation Maintenance AQF 4 Competency Standard Units

Unit Code	Unit Title	Wtg Pts	AQF Level	Prerequisite/s	Qualification Core	Qualification Elective
UEPMNT401B	Install and Maintain Complex Mechanical Seals	40	4	UEPMNT304B; MEM18006C; MEM9002B; MEM12023A; MEM18001C; MEM18002B; MEM18003C; MEM18055B		UEP40312; UEP50312
UEPMNT402B	Conduct Complex Levelling and Alignment	40	4	MEM18009B; MEM9002B; MEM12023A; MEM18001C; MEM18002B; MEM18003C; MEM18055B; MEM18006C		UEP40312; UEP50312
UEPMNT403B	Maintain Complex Mechanical Valves	40	4	UEPMNT303B; MEM18006C; MEM9002B; MEM12023A; MEM18001C; MEM18002B; MEM18003C; MEM18055B		UEP40312; UEP50312
UEPMNT404B	Maintain Complex Mechanical Pumps	40	4	UEPMNT304B; MEM18006C; MEM9002B; MEM12023A; MEM18001C; MEM18002B; MEM18003C; MEM18055B		UEP40312; UEP50312
UEPMNT406B	Install and Maintain a Steam Turbine	100	4	UEPMNT402B; MEM18009B; MEM9002B; MEM12023A; MEM18001C; MEM18002B; MEM18003C; MEM18055B; MEM18006C		UEP40312; UEP50312
UEPMNT407B	Install and Maintain a Gas Turbine	100	4	UEPMNT402B; MEM18009B; MEM9002B; MEM12023A; MEM18001C;		UEP40312; UEP50312

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Unit Code	Unit Title	Wtg Pts	AQF Level	Prerequisite/s	Qualification Core	Qualification Elective
				MEM18002B; MEM18003C; MEM18055B; MEM18006C		
UEPMNT408B	Install Hydro Turbines	100	4	UEPMNT402B; MEM18009B; MEM9002B; MEM12023A; MEM18001C; MEM18002B; MEM18003C; MEM18055B; MEM18006C		UEP40312; UEP50312
UEPMNT410B	Diagnose and Repair Faults in Electronic Equipment	60	4	UEENEEG108A; UEENEEE101A; UEENEEE102A; UEENEEE104A; UEENEEE105A; UEENEEE107A; UEENEEG006A; UEENEEG033A; UEENEEG063A; UEENEEG101A; UEENEEG102A; UEENEEG106A		UEP40512; UEP50412
UEPMNT411B	Diagnose and Repair Faults in Complex Electrical Equipment	60	4	UEENEEG108A; UEENEEE101A; UEENEEE102A; UEENEEE104A; UEENEEE105A; UEENEEE107A; UEENEEG006A; UEENEEG033A; UEENEEG063A; UEENEEG101A; UEENEEG102A; UEENEEG106A		UEP40512; UEP50412
UEPMNT412B	Modify Complex Electrical Equipment	60	4	UEPMNT350B; UEENEEG108A; UEENEEE101A; UEENEEE102A; UEENEEE104A; UEENEEE105A; UEENEEE107A; UEENEEG006A; UEENEEG033A;		UEP40512; UEP50412

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Unit Code	Unit Title	Wtg Pts	AQF Level	Prerequisite/s	Qualification Core	Qualification Elective
				UEENEEG063A; UEENEEG101A; UEENEEG102A; UEENEEG106A		
UEPMNT413B	Modify Electronic Electrical Equipment	60	4	UEPMNT350B; UEENEEG108A; UEENEEE101A; UEENEEE102A; UEENEEE104A; UEENEEE105A; UEENEEE107A; UEENEEG006A; UEENEEG033A; UEENEEG063A; UEENEEG101A; UEENEEG102A; UEENEEG106A		UEP40512; UEP50412
UEPMNT414B	Test and Commission Complex Electrical Equipment	60	4	UEPMNT351B; UEENEEG108A; UEENEEE101A; UEENEEE102A; UEENEEE104A; UEENEEE105A; UEENEEE107A; UEENEEG006A; UEENEEG033A; UEENEEG063A; UEENEEG101A; UEENEEG102A; UEENEEG106A		UEP40512; UEP50412
UEPMNT415B	Diagnose and Repair Faults in Complex Refrigeration / Air Conditioning Equipment	60	4	UEENEEG108A; UEENEEE101A; UEENEEE102A; UEENEEE104A; UEENEEE105A; UEENEEE107A; UEENEEG006A; UEENEEG033A; UEENEEG063A; UEENEEG101A; UEENEEG102A; UEENEEG106A		UEP40512; UEP50412

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Unit Code	Unit Title	Wtg Pts	AQF Level	Prerequisite/s	Qualification Core	Qualification Elective
UEPMNT416B	Overhaul Electrical Generators	80	4	UEPMNT351B; UEENEEG108A; UEENEEE101A; UEENEEE102A; UEENEEE104A; UEENEEE105A; UEENEEE107A; UEENEEG006A; UEENEEG033A; UEENEEG063A; UEENEEG101A; UEENEEG102A; UEENEEG106A		UEP40512; UEP50412
UEPMNT417B	Inspect Electrical Generators and Diagnose Faults	80	4	UEPMNT351B; UEENEEG108A; UEENEEE101A; UEENEEE102A; UEENEEE104A; UEENEEE105A; UEENEEE107A; UEENEEG006A; UEENEEG033A; UEENEEG063A; UEENEEG101A; UEENEEG102A; UEENEEG106A		UEP40512; UEP50412
UEPMNT419B	Perform Civil Drafting MEM09002B	60	4	UEENEEE107A; UEENEEE101A or MEM09002B		UEP40312; UEP50312
UEPMNT421B	Conduct Technical Inspection of Process Plant and Equipment	60	4	UEPMNT351B; UEENEEG108A; UEENEEE101A; UEENEEE102A; UEENEEE104A; UEENEEE105A; UEENEEE107A; UEENEEG006A; UEENEEG033A; UEENEEG063A; UEENEEG101A; UEENEEG102A; UEENEEG106A	UEP50312	UEP40312; UEP40412; UEP40512; UEP50412
UEPMNT422B	Conduct Performance Testing on Process	60	4	UEPMNT351B; UEENEEG108A; UEENEEE101A; UEENEEE102A; UEENEEE104A; UEENEEE105A; UEENEEE107A;		UEP40312; UEP40412; UEP40512;

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Unit Code	Unit Title	Wtg Pts	AQF Level	Prerequisite/s	Qualification Core	Qualification Elective
	Plant and Equipment			UEENEEG006A; UEENEEG033A; UEENEEG063A; UEENEEG101A; UEENEEG102A; UEENEEG106A		UEP50312; UEP50412
UEPMNT424B	Monitor Efficiency of Thermal Steam Cycle Power Plant	60	4	UEENEEG108A; UEENEEE101A; UEENEEE102A; UEENEEE104A; UEENEEE105A; UEENEEE107A; UEENEEG006A; UEENEEG033A; UEENEEG063A; UEENEEG101A; UEENEEG102A; UEENEEG106A		UEP40312; UEP40412; UEP40512; UEP50312; UEP50412
UEPMNT425B	Maintain Complex Instrumentation Equipment	80	4	UEPMNT356B; UEENEEI101A; UEENEEE102A; UEENEEE105A; UEENEEE107A		UEP40512; UEP50412
UEPMNT426B	Maintain Electronic Instrumentation Equipment	80	4	UEPMNT356B; UEENEEI101A; UEENEEE102A; UEENEEE105A; UEENEEE107A		UEP40512; UEP50412
UEPMNT427B	Diagnose and Repair Faults in Complex Instrumentation Equipment	80	4	UEPMNT357B; UEENEEI101A; UEENEEE102A; UEENEEE105A; UEENEEE107A		UEP40512; UEP50412
UEPMNT428B	Modify Complex Instrumentation Equipment	80	4	UEPMNT358B; UEENEEI101A; UEENEEE102A; UEENEEE105A; UEENEEE107A		UEP40512; UEP50412

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Unit Code	Unit Title	Wtg Pts	AQF Level	Prerequisite/s	Qualification Core	Qualification Elective
UEPMNT429B	Modify Electronic Instrumentation Equipment	80	4	UEPMNT358B; UEENEEI101A; UEENEEE102A; UEENEEE105A; UEENEEE107A		UEP40512; UEP50412
UEPMNT430B	Test and Commission Complex Instrumentation Equipment	80	4	UEPMNT359B; UEENEEI101A; UEENEEE102A; UEENEEE105A; UEENEEE107A		UEP40512; UEP50412
UEPMNT431B	Test and Commission Electronic Instrumentation Equipment	80	4	UEPMNT359B; UEENEEI101A; UEENEEE102A; UEENEEE105A; UEENEEE107A		UEP40512; UEP50412
UEPMNT432B	Write Programs for Control Systems	80	4	UEPMNT351B; UEENEEG108A; UEENEEE101A; UEENEEE102A; UEENEEE104A; UEENEEE105A; UEENEEE107A; UEENEEG006A; UEENEEG033A; UEENEEG063A; UEENEEG101A; UEENEEG102A; UEENEEG106A		UEP40512
UEPMNT433B	Conduct Routine Generation Electrical Maintenance	60	4	UEPMNT346B; UEENEEG108A; UEENEEE101A; UEENEEE102A; UEENEEE104A; UEENEEE105A; UEENEEE107A; UEENEEG006A; UEENEEG033A; UEENEEG063A; UEENEEG101A; UEENEEG102A; UEENEEG106A		UEP40512

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Unit Code	Unit Title	Wtg Pts	AQF Level	Prerequisite/s	Qualification Core	Qualification Elective
UEPMNT434A	Diagnose and Repair Faults in Wind Turbine Control Systems	80	4	UEPMNT362A; UEENEEG108A; UEENEEE101A; UEENEEE102A; UEENEEE104A; UEENEEE105A; UEENEEE107A; UEENEEG006A; UEENEEG033A; UEENEEG063A; UEENEEG101A; UEENEEG102A; UEENEEG106A		UEP40512
UEPMNT435A	Diagnose and Repair Faults in Wind Turbine Mechanical Systems	80	4	UEPMNT361A		UEP50312
UEPMNT436A	Test and Commission Wind Turbine Control Systems	80	4	UEPMNT362A; UEENEEG108A; UEENEEE101A; UEENEEE102A; UEENEEE104A; UEENEEE105A; UEENEEE107A; UEENEEG006A; UEENEEG033A; UEENEEG063A; UEENEEG101A; UEENEEG102A; UEENEEG106A		UEP40512
UEPMNT440A	Diagnose and repair faults in power plant inverter systems	60	4	UEPMNT366A; UEENEEG108A; UEENEEE101A; UEENEEE102A; UEENEEE104A; UEENEEE105A; UEENEEE107A; UEENEEG006A; UEENEEG033A; UEENEEG063A; UEENEEG101A; UEENEEG102A; UEENEEG106A		UEP40512
UEPMNT441A	Test and commission power plant inverter	60	4	UEPMNT366A; UEENEEG108A; UEENEEE101A; UEENEEE102A; UEENEEE104A;		UEP40512

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Unit Code	Unit Title	Wtg Pts	AQF Level	Prerequisite/s	Qualification Core	Qualification Elective
	systems			UEENEEE105A; UEENEEE107A; UEENEEG006A; UEENEEG033A; UEENEEG063A; UEENEEG101A; UEENEEG102A; UEENEEG106A		
UEPMNT442A	Maintain wind turbine generator electrical systems	60	4	UEPMNT371A; UEENEEG006A; UEENEEE101A; UEENEEE102A; UEENEEE104A; UEENEEE105A; UEENEEE107A; UEENEEG101A; UEENEEG102A; UEENEEG106A		UEP40612
UEPMNT443A	Maintain wind turbine generator control systems	60	4	UEPMNT371A; UEENEEE101A		UEP40612
UEPMNT444A	maintain wind turbine generator mechanical systems	60	4	UEPMNT371A; UEENEEE101A		UEP40612
UEPMNT445A	Diagnose and repair faults in large scale wind turbine generators	60	4	UEPMNT371A; UEENEEG108A; UEENEEE101A; UEENEEE102A; UEENEEE104A; UEENEEE105A; UEENEEE107A; UEENEEG006A; UEENEEG033A; UEENEEG063A; UEENEEG101A; UEENEEG102A; UEENEEG106A		UEP40612
UEPMNT446A	Coordinate maintenance on a wind	60	4	UEPMNT445A; UEPMNT448B; UEPMNT449B; UEPMNT371A; UEENEEG108A; UEENEEE101A;		UEP40612

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Unit Code	Unit Title	Wtg Pts	AQF Level	Prerequisite/s	Qualification Core	Qualification Elective
	farm			UEENEEE102A; UEENEEE104A; UEENEEE105A; UEENEEG107A; UEENEEG006A; UEENEEG033A; UEENEEG063A; UEENEEG101A; UEENEEG102A; UEENEEG106A; UEPMNT443A; UEENEEE107A; UEPMNT444A		
UEPMNT447A	Diagnose and repair faults in wind turbine generator electrical systems	60	4	UEPMNT371A; UEPMNT442A; UEPMNT445A; UEENEEE101A; UEENEEE102A; UEENEEE104A; UEENEEE105A; UEENEEE107A; UEENEEG006A; UEENEEG033A; UEENEEG063A; UEENEEG101A; UEENEEG102A; UEENEEG106A; UEENEEG108A		UEP40612
UEPMNT448A	Diagnose and repair faults in wind turbine generator control systems	60	4	UEPMNT371A; UEPMNT443A; UEPMNT445A; UEENEEG108A; UEENEEE101A; UEENEEE102A; UEENEEE104A; UEENEEE105A; UEENEEE107A; UEENEEG006A; UEENEEG033A; UEENEEG063A; UEENEEG101A; UEENEEG102A; UEENEEG106A		UEP40612
UEPMNT449A	Diagnose and repair mechanical systems faults in wind turbine generators	60	4	UEPMNT371A; UEPMNT444A; UEPMNT445A; UEENEEG108A; UEENEEE101A; UEENEEE102A; UEENEEE104A; UEENEEE105A; UEENEEE107A; UEENEEG006A; UEENEEG033A;		UEP40612

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Unit Code	Unit Title	Wtg Pts	AQF Level	Prerequisite/s	Qualification Core	Qualification Elective
				UEENEEG063A; UEENEEG101A; UEENEEG102A; UEENEEG106A		
UEPMNT450A	Test and commission wind turbine generators	60	4	UEPMNT371A; UEPMNT444A; UEPMNT443A; UEPMNT448A; UEPMNT449A; UEPMNT445A; UEENEEG108A; UEENEEE101A; UEENEEE102A; UEENEEE104A; UEENEEE105A; UEENEEE107A; UEENEEG006A; UEENEEG033A; UEENEEG063A; UEENEEG101A; UEENEEG102A; UEENEEG106A		UEP40612

Power Generation Maintenance AQF 5 Competency Standard Units

Unit Code	Unit Title	Wtg Pts	AQF Level	Prerequisite/s	Qualification Core	Qualification Elective
UEPMNT501B	Diagnose and Repair Faults in Electrical and Electronic Systems	100	5	UEPMNT410B; UEPMNT411B; UEENEEG108A; UEENEEE101A; UEENEEE102A; UEENEEE104A; UEENEEE105A; UEENEEE107A; UEENEEG006A; UEENEEG033A; UEENEEG063A; UEENEEG101A; UEENEEG102A; UEENEEG106A		UEP50412
UEPMNT502B	Test and Commission Electronic Electrical Systems	100	5	UEPMNT352B; UEENEEG108A; UEENEEE101A; UEENEEE102A; UEENEEE104A; UEENEEE105A; UEENEEE107A; UEENEEG006A; UEENEEG033A;		UEP50412

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Unit Code	Unit Title	Wtg Pts	AQF Level	Prerequisite/s	Qualification Core	Qualification Elective
				UEENEEG063A; UEENEEG101A; UEENEEG102A; UEENEEG106A		
UEPMNT503B	Diagnose and Repair Faults in Instrumentation Systems	100	5	UEPMNT427B; UEPMNT357B; UEENEEI101A; UEENEEE102A; UEENEEE105A; UEENEEE107A		UEP50412
UEPMNT504B	Test and Commission Instrumentation Systems	100	5	UEPMNT430B; UEPMNT359B; UEENEEI101A; UEENEEE102A; UEENEEE105A; UEENEEE107A		UEP50412

High Risk Licensing Competency Standard Units

Unit Code	Unit Title	Wtg Pts	AQF Level	Prerequisite/s	Qualification Core	Qualification Elective
UEPOPL001A	Licence to operate a steam turbine	60	4	Nil		UEP40212; UEP50212
UEPOPL002A	Licence to operate a reciprocating steam engine	60	4	Nil		UEP40212; UEP50212

Imported Competency Standard Units

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BSB07 Business Services Training Package

Unit Code	Unit Title	Wtg Pts	AQF Level	Prerequisite/s	Qualification Core	Qualification Elective
BSBFLM303C	Contribute to effective workplace relationships	40	3	Nil		UEP30212; UEP30112
BSBFLM305C	Support operational plan	40	3	Nil		UEP30212; UEP30112
BSBFLM306C	Provide workplace information and resourcing plans	40	3	Nil		UEP30212; UEP30112
BSBFLM309C	Support continuous improvement systems and processes	40	3	Nil		UEP30212; UEP30112
BSBFLM311C	Support a workplace learning environment	40	3	Nil		UEP30212; UEP30112
BSBFLM312C	Contribute to team effectiveness	40	3	Nil		UEP30112; UEP30212
BSBINN301A	Promote innovation in a team environment	40	3	Nil		UEP30112; UEP30212; UEP40112; UEP40212; UEP40312; UEP40412; UEP40512
BSBWOR301B	Organise personal work priorities	40	3	Nil		UEP30112; UEP30212

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Unit Code	Unit Title	Wtg Pts	AQF Level	Prerequisite/s	Qualification Core	Qualification Elective
	and development					
BSBCUS401B	Coordinate implementation of customer service strategies	40	4	Nil		UEP40112; UEP40212; UEP40312; UEP40412; UEP40512
BSBINM401A	Implement workplace information system	40	4	Nil		UEP40112; UEP40212; UEP40312; UEP40412; UEP40512
BSBLED401A	Develop teams and individuals	40	4	Nil		UEP40112; UET40212; UEP40312; UEP40412; UEP40512
BSBMGT402A	Implement operational plan	40	4	Nil		UEP40112; UEP40212; UEP40312; UEP40412; UEP40512
BSBMGT403A	Implement continuous improvement	40	4	Nil		UEP40112; UEP40212; UEP40312; UEP40412; UEP40512
BSBWOR401A	Establish effective workplace relationships	50	4	Nil		UEP40112; UEP40212; UEP40312; UEP40412; UEP40512
BSBWOR402A	Promote team effectiveness	50	4	Nil		UEP40112; UEP40212; UEP40312; UEP40412; UEP40512
BSBWOR404B	Develop Work Priorities	40	4	Nil		UEP40112; UEP40212; UEP40312; UEP40412; UEP40512
BSBCUS501C	Manage quality customer service	40	5	Nil		UEP50112; UEP50212; UEP50312; UEP50412

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Unit Code	Unit Title	Wtg Pts	AQF Level	Prerequisite/s	Qualification Core	Qualification Elective
BSBINM501A	Manage an information or knowledge management system	50	5	Nil		UEP50112; UEP50212; UEP50312; UEP50412
BSBINN502A	Build and sustain an innovative work environment	50	5	Nil		UEP50112; UEP50212; UEP50312; UEP50412
BSBLED501A	Develop a workplace learning environment	60	5	Nil		UEP50112; UEP50212; UEP50312; UEP50412
BSBMGT502B	Manage people performance	70	5	Nil		UEP50112; UEP50212; UEP50312; UEP50412
BSBMGT515A	Manage operational plan	60	5	Nil		UEP50112; UEP50212; UEP50312; UEP50412
BSBMGT516C	Facilitate continuous improvement	60	5	Nil		UEP50112; UEP50212; UEP50312; UEP50412
BSBOHS509A	Ensure a Safe Workplace	60	5	Nil		UEP50112; UEP50212; UEP50312; UEP50412
BSBWOR501B	Manage personal work priorities and professional development	60	5	Nil		UEP50112; UEP50212; UEP50312; UEP50412
BSBWOR502B	Ensure team effectiveness	60	5	Nil		UEP50112; UEP50212; UEP50312; UEP50412

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CPC08 Construction, Plumbing and Services Integrated Framework Training Package

Unit Code	Unit Title	Wtg Pts	AQF Level	Prerequisite/s	Qualification Core	Qualification Elective
CPCCCM2007B	Use explosive power tools	15	3	Nil		UEP20112; UEP30112; UEP30212; UEP40312; UEP40412
CPCCLDG3001A	Licence to perform dogging	30	3	Nil		UEP20112; UEP30112; UEP30212; UEP40312; UEP40412
CPCCLHS3001A	Licence to operate a personnel and materials hoist	30	3	Nil		UEP20112; UEP30112; UEP30212
CPCCLHS3002A	Licence to operate a materials hoist	20	3	Nil		UEP20112; UEP30112; UEP30212
CPCCLRG3001A	Licence to perform rigging basic level	40	3	Nil		UEP20112; UEP30112; UEP30212; UEP40312; UEP40412
CPCCLRG3002A	Licence to perform rigging intermediate level	40	3	Nil		UEP20112; UEP30112; UEP30212; UEP40312; UEP40412
CPCCLRG4001A	Licence to perform rigging advanced level	40	3	Nil		UEP30112; UEP30212
CPCCLSF2001A	Licence to erect, alter and dismantle	40	3	Nil		UEP20112; UEP30112;

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Unit Code	Unit Title	Wtg Pts	AQF Level	Prerequisite/s	Qualification Core	Qualification Elective
	scaffolding basic level					UEP30212; UEP40312; UEP40412
CPCCLSF3001A	Licence to erect, alter and dismantle scaffolding intermediate level	40	3	Nil		UEP20112; UEP30112; UEP30212
CPCCLSF4001A	Licence to erect, alter and dismantle scaffolding advanced level	40	3	Nil		UEP30112; UEP30212;

LGA04 Local Government Training Package

Unit Code	Unit Title	Wtg Pts	AQF Level	Prerequisite/s	Qualification Core	Qualification Elective
LGAWORK404A	Manage a civil works project	80	4	Nil		UEP50212

MEM05 Metal and Engineering Training Package

Unit Code	Unit Title	Wtg Pts	AQF Level	Prerequisite/s	Qualification Core	Qualification Elective
MEM05004C	Perform routine oxy acetylene welding	20	3	Nil		UEP20112; UEP30112; UEP30212; UEP40112; UEP40312; UEP40412
MEM05005B	Carry out mechanical cutting	20	3	MEM12023A; MEM18001C		UEP40412

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Unit Code	Unit Title	Wtg Pts	AQF Level	Prerequisite/s	Qualification Core	Qualification Elective
MEM05007C	Perform manual heating and thermal cutting	20	3	Nil	UEP40412	UEP20112; UEP30112; UEP30212; UEP40112; UEP40312; UEP50312
MEM05011D	Assemble fabricated components	80	3	MEM05015D; MEM05017D; MEM05019D; MEM05022C; OR MEM05005B; MEM12023A; MEM18001C; MEM05005B; MEM09002B; MEM05007C;		UEP40412
MEM05012C	Perform routine manual metal arc welding	20	3	Nil	UEP40412	UEP20112; UEP30112; UEP30212; UEP40112; UEP40312; UEP50312
MEM05015D	Weld using manual metal arc welding process	40	3	MEM05012C MEM05051A	UEP40412	UEP50312

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Unit Code	Unit Title	Wtg Pts	AQF Level	Prerequisite/s	Qualification Core	Qualification Elective
				MEM05052A MEM12023A MEM18001C MEM18002B		
MEM05016C	Perform advanced welding using manual metal arc welding process	40	4	MEM05012C MEM05051A MEM05052A MEM12023A MEM18001C MEM18002B MEM05015C MEM09002B MEM05007C	UEP40412	UEP50312
MEM05017D	Weld using gas metal arc welding process	40	3	MEM05012C MEM05051A MEM05052A MEM12023A MEM18001C	UEP40412	UEP50312

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Unit Code	Unit Title	Wtg Pts	AQF Level	Prerequisite/s	Qualification Core	Qualification Elective
				MEM18002B MEM05050B		
MEM05018C	Perform advanced welding using gas metal arc welding process	40	3	MEM05012C MEM05051A MEM05052A MEM12023A MEM18001C MEM18002B MEM05050B MEM05017D MEM09002B MEM05007C	UEP40412	UEP50312
MEM05019D	Weld using gas tungsten arc welding process	40	3	MEM05012C MEM05051A MEM05052A MEM12023A MEM18001C MEM18002B		UEP40412

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Unit Code	Unit Title	Wtg Pts	AQF Level	Prerequisite/s	Qualification Core	Qualification Elective
				MEM05049B		
MEM05020C	Perform advanced welding using gas tungsten arc welding process	40	4	MEM05012C MEM05051A MEM05052A MEM12023A MEM18001C MEM18002B MEM05049B MEM05019D MEM09002B MEM05007C MEM05018C		UEP40412
MEM05022C	Perform advanced welding using oxy acetylene welding process	60	4	MEM05004C MEM05007C MEM05051A MEM05052A MEM09002B MEM18001C		UEP40412

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Unit Code	Unit Title	Wtg Pts	AQF Level	Prerequisite/s	Qualification Core	Qualification Elective
				MEM18002B		
MEM05024C	Perform welding supervision	120	5	MEM05026C	UEP40412	UEP50312
MEM05025C	Perform welding/fabrication inspection	120	4	MEM05026C; MEM12023A		UEP40412
MEM05026C	Apply welding principles	40	3	Nil	UEP40412	UEP50312
MEM05036C	Repair/replace/modify fabrications	40	3	MEM05015D MEM05017D MEM05019D MEM05022C OR MEM05005B MEM12023A MEM18001C MEM09002B MEM05007C MEM05011D		UEP40412
MEM05042B	Perform welds to code standards using flux core arc welding	60	4	MEM05050B MEM05051B		UEP40412

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Unit Code	Unit Title	Wtg Pts	AQF Level	Prerequisite/s	Qualification Core	Qualification Elective
	process			MEM05052B MEM12023B MEM18001C MEM18002B MEM05047B MEM05007C MEM09002B MEM05048B MEM05026C		
MEM05043B	Perform welds to code standards using gas metal arc welding process	60	4	MEM05051A MEM05052A MEM12023A MEM18001C MEM18002B MEM05050B MEM05017D MEM09002B MEM05007C MEM05018C		UEP40412

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Unit Code	Unit Title	Wtg Pts	AQF Level	Prerequisite/s	Qualification Core	Qualification Elective
				MEM05026C		
MEM05044B	Perform welds to code standards using gas tungsten arc welding process	60	4	MEM05020C MEM05026C		UEP40412
MEM05045B	Perform pipe welds to code standards using manual metal arc welding process	60	4	MEM05012C MEM05051A MEM05052A MEM12023A MEM18001C MEM18002B MEM05015D MEM09002B MEM05007C MEM05016C MEM05026C		UEP40412
MEM05046B	Perform welds to code standards using manual metal arc welding process	60	4	MEM05012C MEM05051A MEM05052A MEM12023A		UEP40412

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Unit Code	Unit Title	Wtg Pts	AQF Level	Prerequisite/s	Qualification Core	Qualification Elective
				MEM18001C MEM18002B MEM05015D MEM09002B MEM05007C MEM05016C MEM05026C		
MEM05047B	Weld using flux core arc welding process	40	3	MEM05050B MEM05051B MEM05052B MEM12023B MEM18001C MEM18002B		UEP40412
MEM05048B	Perform advanced welding using flux core arc welding process	40	4	MEM05050B MEM05051B MEM05052B MEM12023B MEM18001C		UEP40412

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Unit Code	Unit Title	Wtg Pts	AQF Level	Prerequisite/s	Qualification Core	Qualification Elective
				MEM18002B MEM05047B MEM05007C MEM09002B		
MEM05049B	Perform routine gas tungsten arc welding	20	3	Nil		UEP40412
MEM05050B	Perform routine gas metal arc welding	20	3	Nil	UEP40412	UEP50312
MEM05051A	Select welding processes	20	3	Nil	UEP40412	UEP50312
MEM05052A	Apply safe welding practices	40	3	Nil	UEP40412	UEP50312
MEM07005C	Perform general machining	80	3	MEM09002B; MEM12023A; MEM18001C	UEP40312	UEP50312
MEM07006C	Perform lathe operations	40	3	MEM09002B; MEM12023A; MEM18001C MEM07005C	UEP40312	UEP50312
MEM07007C	Perform milling operations	40	3	MEM09002B; MEM12023A; MEM18001C MEM07005C	UEP40312	UEP50312

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Unit Code	Unit Title	Wtg Pts	AQF Level	Prerequisite/s	Qualification Core	Qualification Elective
MEM07008D	Perform grinding operations	40	3	MEM09002B; MEM12023A; MEM18001C MEM07005C	UEP40312	UEP50312
MEM07011B	Perform complex milling operations	40	4	MEM09002B; MEM12023A; MEM18001C MEM07005C MEM07007C MEM12024A MEM12003B MEM12023A		UEP40312; UEP50312
MEM07012B	Perform complex grinding operations	40	4	MEM09002B; MEM12023A; MEM18001C MEM07005C MEM07008C MEM12003B		UEP40312; UEP50312
MEM07021B	Perform complex lathe operations	40	4	MEM09002B; MEM12023A; MEM18001C MEM07005C MEM07006C		UEP40312; UEP50312

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Unit Code	Unit Title	Wtg Pts	AQF Level	Prerequisite/s	Qualification Core	Qualification Elective
				MEM12023A MEM12023A MEM12003B		
MEM09002B	Interpret technical drawing	40	3	Nil	UEP40312; UEP40412; UEP50312	
MEM09003B	Prepare basic engineering drawing	80	3	MEM09002B		UEP40312
MEM09004B	Perform electrical/electronic detail drafting	80	4	MEM09002B MEM09003B		UEP40312
MEM09005B	Perform basic engineering detail drafting	80	3	MEM09002B MEM09003B		UEP40312
MEM09006B	Perform advanced engineering detail drafting	40	4	MEM09002B MEM09003B MEM09005B		UEP40312
MEM12003B	Perform precision mechanical measurement	20	4	MEM12023A	UEP40312	UEP50312
MEM12007D	Mark off/out structural fabrications and shapes	40	3	MEM12023A		UEP40412

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Unit Code	Unit Title	Wtg Pts	AQF Level	Prerequisite/s	Qualification Core	Qualification Elective
MEM12023A	Perform Engineering Measurements	50	3	Nil	UEP40312; UEP40412; UEP50312	
MEM12024A	Perform Computations	30	3	Nil	UEP40312	UEP40412; UEP50312
MEM18001C	Use hand tools	20	3	Nil	UEP40312; UEP40412; UEP50312	
MEM18002B	Use power tools/hand held operations	20	3	Nil	UEP40312; UEP40412; UEP50312	
MEM18003C	Use tools for precision work	40	3	MEM12023A; MEM18001C; MEM18002B	UEP40312	UEP50312
MEM18006C	Repair and fit engineering components	60	3	MEM9002B; MEM12023A; MEM18001C; MEM18002B; MEM18003C; MEM18055B	UEP40312	UEP50312
MEM18007B	Maintain and repair mechanical drives and mechanical transmission assemblies	40	3	MEM9002B; MEM12023A; MEM18001C; MEM18002B; MEM18003C; MEM18055B MEM18006C; MEM18009B	UEP40312	UEP50312

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Unit Code	Unit Title	Wtg Pts	AQF Level	Prerequisite/s	Qualification Core	Qualification Elective
MEM18009B	Perform levelling and alignment of machines and engineering components	40	3	MEM9002B; MEM12023A; MEM18001C; MEM18002B; MEM18003C; MEM18055B MEM18006C;	UEP40312	UEP50312
MEM18010C	Perform equipment condition monitoring and recording	40	4	MEM9002B; MEM12023A; MEM18001C; MEM18002B; MEM18003C MEM 18055B		UEP40312; UEP50312
MEM18018C	Maintain pneumatic system components	40	3	MEM9002B; MEM12023A; MEM18001C; MEM18002B; MEM18003C; MEM18055B MEM18006C;		UEP40312
MEM18019B	Maintain pneumatic systems	40	3	MEM9002B; MEM12023A; MEM18001C; MEM18002B; MEM18003C; MEM18055B MEM18006C; MEM18018C		UEP40312
MEM18020B	Maintain hydraulic system components	40	4	MEM9002B; MEM12023A; MEM18001C; MEM18002B; MEM18003C; MEM18055B MEM18006C		UEP40312

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Unit Code	Unit Title	Wtg Pts	AQF Level	Prerequisite/s	Qualification Core	Qualification Elective
MEM18021B	Maintain hydraulic systems	40	4	MEM9002B; MEM12023A; MEM18001C; MEM18002B; MEM18003C; MEM18055B MEM18006C; MEM18020C		UEP40312
MEM18022B	Maintain fluid power controls	80	4	MEM9002B; MEM12023A; MEM18001C; MEM18002B; MEM18003C; MEM18055B MEM18006C; MEM18018C OR MEM9002B; MEM12023A; MEM18001C; MEM18002B; MEM18003C; MEM18055B MEM18006C; MEM18020C		UEP40312
MEM18055B	Dismantle, replace and assemble engineering components	30	3	MEM9002B; MEM12023A; MEM18001C; MEM18002B; MEM18003C	UEP40312	UEP50312

NWP07 Water Training Package

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Unit Code	Unit Title	Wtg Pts	AQF Level	Prerequisite/s	Qualification Core	Qualification Elective
NWP318A	Monitor and Operate Gated Spillways	50	3	Nil		UEP30112; UEP30212
NWP319A	Monitor and Control Dam Operations	50	3	Nil		UEP30112; UEP30212
NWP320B	Monitor and Implement Dam Maintenance	50	3	Nil		UEP30112; UEP30212

RII09 Resources and Infrastructure Industry Training Package

Unit Code	Unit Title	Wtg Pts	AQF Level	Prerequisite/s	Qualification Core	Qualification Elective
RIIMPO304B	Conduct wheel loader operations	40	3	Nil		UEP20112; UEP30112; UEP30212
RIIMPO308B	Conduct tracked dozer operations	40	3	Nil		UEP20112; UEP30112; UEP30212
RIIMPO309A	Conduct wheeled dozer operations	40	3	Nil		UEP20112; UEP30112; UEP30212
RIIMPO318B	Conduct skid steer loader operations	70	3	Nil		UEP30112; UEP30212
RIIMPO319A	Conduct backhoe/loader operations	50	3	Nil		UEP20112; UEP30112; UEP30212
RIIHAN309A	Conduct Telescopic Materials Handler Operations	80	3	Nil		UEP30112; UEP30212; UEP40312; UEP40412

TAE10 Training and Education Training Package

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Unit Code	Unit Title	Wtg Pts	AQF Level	Prerequisite/s	Qualification Core	Qualification Elective
TAEDEL301A	Provide training through instruction and demonstration of work skills	40	3	Nil		UEP40112: UEP40212; UEP40312; UEP40412; UEP40512

TLI10 Transport and Logistics Training Package

Unit Code	Unit Title	Wtg Pts	AQF Level	Prerequisite/s	Qualification Core	Qualification Elective
TLILIC0012A	License to operate a vehicle loading crane (Capacity 10 metre tonnes and above)	40	3	Nil		UEP20112; UEP40312; UEP40412
TLILIC2001A	Licence to operate a forklift truck	40	3	Nil		UEP20112; UEP30112; UEP30212; UEP40312; UEP40412
TLILIC2005A	License to Operate a Boom Type Elevating Work Platform (Boom Length 11 Metres or more)	30	3	Nil		UEP20112; UEP40312; UEP40412
TLILIC3006A	Licence to operate a non-slewing mobile crane (greater than 3 tonnes capacity)	60	3	Nil		UEP20112; UEP40312

UEE11 Electrotechnology Training Package

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Unit Code	Unit Title	Wtg Pts	AQF Level	Prerequisite/s	Qualification Core	Qualification Elective
UEENEEC001B	Maintain documentation	20	3	Nil		UEP40512; UEP40612
UEENEEC005B	Estimate electrotechnology projects	40	4	Nil		UEP40112; UEP40512; UEP50112; UEP50412
UEENEEC010B	Deliver a service to customers	20	2	Nil		UEP40512; UEP40612
UEENEED101A	Use computer applications relevant to a workplace	20	2	Nil		UEP40512; UEP40612
UEENEED104A	Use software for engineering applications	40	3	Nil		UEP40512
UEENEEE009B	Comply with scheduled and preventative maintenance program processes	20	3	None		UEP40612
UEENEEE038B	Participate in development and follow a personal competency development plan	20	2	None	UEP40612	

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Unit Code	Unit Title	Wtg Pts	AQF Level	Prerequisite/s	Qualification Core	Qualification Elective
UEENEEE101A	Apply Occupational Health Safety regulations, codes and practices in the workplace	20	2	Nil	UEP20112; UEP30112; UEP30212; UEP40112; UEP40212; UEP40312; UEP40412; UEP40512; UEP40612; UEP50112; UEP50212; UEP50312; UEP50412	
UEENEEE102A	Fabricate, dismantle, assemble of utilities industry components	40	2	UEENEEE101A	UEP40512; UEP40612; UEP50412	UEP20112; UEP30112; UEP30212
UEENEEE104A	Solve problems in d.c. circuits	80	3	UEENEEE101A	UEP40512; UEP40612; UEP50412	
UEENEEE105A	Fix and secure electrotechnology equipment	20	2	UEENEEE101A	UEP40512; UEP40612; UEP50412	
UEENEEE107A	Use drawings, diagrams, schedules, standards, codes and specifications	40	3	UEENEEE101A	UEP40512; UEP40612; UEP50412	
UEENEEE117A	Implement and monitor energy sector OHS policies and procedures	20	4	Nil	UEP40112; UEP40212; UEP40312; UEP40412; UEP40512; UEP40612; UEP50112; UEP50212;	

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Unit Code	Unit Title	Wtg Pts	AQF Level	Prerequisite/s	Qualification Core	Qualification Elective
					UEP50312; UEP50412	
UEENEEE124A	Compile and produce an energy sector detailed report	60	4	Nil		UEP40112 UEP40512; UEP50412
UEENEEE137A	Document and apply measures to control OHS risks associated with electrotechnology work	20	2	UEENEEE101A	UEP40512; UEP40612; UEP50412	
UEENEEE185A	Write work activity reports	20	5	None	UEP40612	
UEENEEF102A	Install and maintain cabling for multiple access to telecommunication services	120	2	UEENEEE101A; UEENEEE102A; UEENEEE104A; UEENEEE105A; UEENEEE107A;		UEP40512; UEP40612
UEENEEF104A	Install and modify performance data communication copper cabling	40	3	UEENEEF102A; UEENEEE101A; UEENEEE102A; UEENEEE104A; UEENEEE105A; UEENEEE107A		UEP40612
UEENEEF105A	Install and modify optical fibre performance data	40	3	UEENEEE101A; UEENEEE102A; UEENEEE104A; UEENEEE105A;		UEP40512

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Unit Code	Unit Title	Wtg Pts	AQF Level	Prerequisite/s	Qualification Core	Qualification Elective
	communication cabling			UEENEEE107A; UEENEEF102A		
UEENEEF107A	Set up and configure the wireless capabilities of communications and data storage devices	40	2	UEENEEE101A		UEP40612
UEENEEF108A	Select and arrange equipment for wireless communication networks	40	3	UEENEEE101A		UEP40612
UEENEEF111A	Test, report and rectify faults in data and voice installations	40	3	UEENEEF104A; UEENEEF105A; UEENEEF102A; UEENEEE102A; UEENEEE104A; UEENEEE105A; UEENEEE107A; UEENEEE101A		UEP40612
UEENEEG006A	Solve problems in single and three phase low voltage machines	80	3	UEENEEG102A UEENEEE101A; UEENEEE102A; UEENEEE104A; UEENEEE105A; UEENEEE107A; UEENEEG101A; UEENEEG106A;	UEP40512; UEP40612; UEP50412	
UEENEEG033A	Solve problems in single and three phase low voltage electrical apparatus and circuits	60	3	UEENEEG102A; UEENEEE101A; UEENEEE102A; UEENEEE104A; UEENEEE105A; UEENEEE107A; UEENEEG101A;	UEP40512; UEP40612; UEP50412	

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Unit Code	Unit Title	Wtg Pts	AQF Level	Prerequisite/s	Qualification Core	Qualification Elective
				UEENEEG106A;		
UEENEEG063A	Arrange circuits, control and protection for general electrical installations	40	3	UEENEEG102A UEENEEE101A; UEENEEE102A; UEENEEE104A; UEENEEE105A; UEENEEE107A; UEENEEG101A; UEENEEG106A;	UEP40512; UEP40612; UEP50412	
UEENEEG101A	Solve problems in electromagnetic devices and related circuits	60	3	UEENEEE104A; UEENEEG101A	UEP40512; UEP40612; UEP50412	
UEENEEG102A	Solve problems in low voltage a.c. circuits	80	3	UEENEEG101A; UEENEEE104A; UEENEEG101A	UEP40512; UEP40612; UEP50412	
UEENEEG106A	Terminate cables, cords and accessories for low voltage circuits	40	3	UEENEEE101A; UEENEEE102A; UEENEEE105A; UEENEEE107B	UEP40512; UEP40612; UEP50412	
UEENEEG108A	Trouble-shoot and repair faults in low voltage electrical apparatus and circuits	40	3	UEENEEE101A; UEENEEE102A; UEENEEE104A; UEENEEE105A; UEENEEE107A; UEENEEG006A; UEENEEG033A; UEENEEG063A; UEENEEG101A; UEENEEG102A; UEENEEG106A	UEP40512; UEP40612; UEP50412	

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Unit Code	Unit Title	Wtg Pts	AQF Level	Prerequisite/s	Qualification Core	Qualification Elective
UEENEEG109A	Develop and connect electrical control circuits	80	3	UEENEEE101A; UEENEEE102A; UEENEEE104A; UEENEEE105A; UEENEEE107A; UEENEEG006A; UEENEEG033A; UEENEEG063A; UEENEEG101A; UEENEEG102A; UEENEEG106A	UEP40512; UEP40612; UEP50412	
UEENEEG110A	Find and repair faults in LV d.c. electrical apparatus and circuits	60	3	UEENEEE101A; UEENEEE102A; UEENEEE104A; UEENEEE105A; UEENEEE107A; UEENEEG006A; UEENEEG033A; UEENEEG063A; UEENEEG101A; UEENEEG102A; UEENEEG106A; UEENEEG108A		UEP40612
UEENEEG111A	Carry out basic repairs to electrical components and equipment	40	2	UEENEEE101A; UEENEEE102A		UEP40612
UEENEEG116A	Diagnose and rectify faults in traction lift systems	80	3	UEENEEE101A; UEENEEE102A; UEENEEE104A; UEENEEE105A; UEENEEE107A; UEENEEG006A; UEENEEG033A; UEENEEG063A; UEENEEG101A; UEENEEG102A; UEENEEG106A; UEENEEG108A		UEP40612
UEENEEG129A	Overhaul and repair major switchgear and	60	3	UEENEEE101A; UEENEEE102A; UEENEEE104A; UEENEEE105A;		UEP40612

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Unit Code	Unit Title	Wtg Pts	AQF Level	Prerequisite/s	Qualification Core	Qualification Elective
	controlgear			UEENEEE107A; UEENEEG111A; UEENEEG164A		
UEENEEG157A	Conduct electrical tests on LV electrical machines	40	3	UEENEEE101A; UEENEEE102A; UEENEEE104A; UEENEEE105A; UEENEEE107A; UEENEEG006A; UEENEEG101A; UEENEEG102A; UEENEEG106A AND UEENEEG150A; UEENEEG151A; UEENEEG153A OR UEENEEG033A; UEENEEG063A; UEENEEG108A		UEP40612
UEENEEG159A	Conduct mechanical tests on electrical machines and components	40	3	UEENEEG157A; UEENEEE101A; UEENEEE102A; UEENEEE104A; UEENEEE105A; UEENEEE107A; UEENEEG006A; UEENEEG101A; UEENEEG102A; UEENEEG106A AND UEENEEG150A; UEENEEG151A; UEENEEG153A OR		UEP40612

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Unit Code	Unit Title	Wtg Pts	AQF Level	Prerequisite/s	Qualification Core	Qualification Elective
				UEENEEG033A; UEENEEG063A; UEENEEG108A		
UEENEEG164A	Repair and maintain mechanical components of electrical machines	40	3	UEENEEE101A; UEENEEE102A; UEENEEE105A; UEENEEE107A; UEENEEG111A		UEP40612
UEENEEG165A	Maintain and service traction lifts systems and equipment	40	3	UEENEEE101A; UEENEEE102A; UEENEEE104A; UEENEEE105A; UEENEEE107A; UEENEEG006A; UEENEEG033A; UEENEEG063A; UEENEEG101A; UEENEEG102A; UEENEEG106A; UEENEEG108A; UEENEEG116A		UEP40612
UEENEEG199A	Conduct compliance and functional verification of electrical apparatus and existing circuits	40	3	UEENEEE101A; UEENEEE102A; UEENEEE104A; UEENEEE105A; UEENEEE107B; UEENEEE137A; UEENEEG006A; UEENEEG033A; UEENEEG063A; UEENEEG101A; UEENEEG102A; UEENEEG106A; UEENEEG108A; UEENEEG109A	UEP40612	
UEENEEH102A	Repairs basic electronic apparatus faults by replacement of components	40	2	UEENEEE102A; UEENEEE101A		UEP40612

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Unit Code	Unit Title	Wtg Pts	AQF Level	Prerequisite/s	Qualification Core	Qualification Elective
UEENEEH111A	Troubleshoot single phase input d.c. power supplies	40	3	UEENEEH102A; And UEENEEH114A; UEENEEE104A; UEENEEH169A Or UEENEEE104A; UEENEEG101A; UEENEEG102A;		UEP40612
UEENEEI101A	Use instrumentation drawings, specifications, standards and equipment manuals	40	3	UEENEEE102A; UEENEEE105A; UEENEEE107A;		UEP40512; UEP40612
UEENEEI107A	Install process instrumentation and tubing and control cabling	20	3	UEENEEI101A UEENEEE102A; UEENEEE105A; UEENEEE107A;		UEP40512
UEENEEI108A	Install process control apparatus and associated equipment	20	3	UEENEEI101A UEENEEE102A; UEENEEE105A; UEENEEE107A;		UEP40512
UEENEEI116A	Assemble, enter and verify operating instructions in microprocessor equipped	20	2	UEENEEE101A		UEP40612

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Unit Code	Unit Title	Wtg Pts	AQF Level	Prerequisite/s	Qualification Core	Qualification Elective
	devices					
UEENEEI150A	Develop, enter and verify discrete control programs for programmable controllers	60	3	UEENEEE101A		UEP40612
UEENEEK142A	Apply environmentally and sustainable energy procedures in the energy sector	20	2	None		UEP40612
UEENEEK145A	Implement and monitor energy sector environmental and sustainable policies and procedures	20	4	None	UEP40612	
UETTDREL16A	Working safely near live electrical apparatus	20	3	Nil		UEP40612
UETTDRIS44A	Perform HV field switching operation to a given schedule	50	3	Common Group UEENEEE101A UEENEEE102A UEENEEE104A UEENEEE105A		UEP40612

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Unit Code	Unit Title	Wtg Pts	AQF Level	Prerequisite/s	Qualification Core	Qualification Elective
				UEENEEE107A UEENEEG101A UEENEEG102A UETTDREL16A Transmission Overhead Pathway UETTDREL11A UETTDREL12A UETTDRIS54A UETTDRTP26A UETTDRTP27A UETTDRTP29A Distribution Overhead Pathway UETTDREL11A UETTDRDP12A UETTDREL12A UETTDRIS41A UETTDRIS42A UETTDRIS52A UETTDRIS54A		

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Unit Code	Unit Title	Wtg Pts	AQF Level	Prerequisite/s	Qualification Core	Qualification Elective
				UETTDRIS56A Rail Traction Pathway UETTDREL11A UETTDREL12A UETTDRIS52A UETTDRIS54A UETTDRRT21A UETTDRRT22A UETTDRRT23A UETTDRRT27A UETTDRRT28A Distribution Cable Jointing Pathway UETTDRCJ21A UETTDRCJ26A UETTDRCJ27A UETTDREL11A UETTDREL12A UETTDRIS41A UETTDRIS42A		

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Unit Code	Unit Title	Wtg Pts	AQF Level	Prerequisite/s	Qualification Core	Qualification Elective
				UETTDRIS55A Electrical Pathway UEENEEE137A UEENEEG006A UEENEEG033A UEENEEG063A UEENEEG106A UEENEEG108A UEENEEG109A UEENEEK142A UETTDRIS67A		

1.2.10 Mapping Standard Competency Units

2.10 Mapping Standard Competency Units

Included in this Training Package is a summary of:

- Competency Standard Units in the ESI - Generation Industry Training Package
- The relationship to former Competency Standard Units

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- Comments to units in the former Training Package
-

Table 1 — Mapping Units of Standard Competency UEP12 ESI - Generation Industry Training Package Version 2 and UEP12 ESI - Generation Industry Training Package Version 1

Power Generation Maintenance AQF 2 Competency Standard Units

UEP12 Version 2 Unit Code	UEP12 Version 2 Unit Title	UEP12 Version 1 Unit Code	UEP12 Version 1 Unit Title	E = Equivalent N = Not Equivalent
UEPMNT202A	Carry out routine work activities in an ESI large scale wind generation environment		New Unit	

Power Generation Maintenance AQF 3 Competency Standard Units

UEP12 Version 2 Unit Code	UEP12 Version 2 Unit Title	UEP12 Version 1 Unit Code	UEP12 Version 1 Unit Title	E = Equivalent N = Not Equivalent
UEPMNT369A	Monitor Climatic Conditions for Renewable Energy Power Generation		New Unit	
UEPMNT370A	Maintain and monitor wind farm civil assets		New Unit	
UEPMNT371A	Maintain large scale wind turbine generators		New Unit	

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Power Generation Maintenance AQF 4 Competency Standard Units

UEP12 Version 2 Unit Code	UEP12 Version 2 Unit Title	UEP12 Version 1 Unit Code	UEP12 Version 1 Unit Title	E = Equivalent N = Not Equivalent
UEPMNT442A	Maintain wind turbine generator electrical systems		New Unit	
UEPMNT443A	Maintain wind turbine generator control systems		New Unit	
UEPMNT444A	Maintain wind turbine generator mechanical systems		New Unit	
UEPMNT445A	Diagnose and repair faults in large scale wind turbine generators		New Unit	
UEPMNT446A	Coordinate maintenance on a wind farm		New Unit	
UEPMNT447A	Diagnose and repair faults in wind turbine generator electrical systems		New Unit	
UEPMNT448A	Diagnose and repair faults in wind turbine generator control systems		New Unit	
UEPMNT449A	Diagnose and repair mechanical systems faults in wind turbine generators		New Unit	
UEPMNT450A	Test and commission wind turbine generators		New Unit	

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Table 2 — Mapping Units of Standard Competency UEP12 ESI - Generation Industry Training Package Version 1 and UEP06 ESI - Generation Industry Training Package Version 1.1

Power Generation Operations AQF 2 Competency Standard Units

UEP12 Version 1 Unit Code	UEP12 Version 1 Unit Title	UEP06 Unit Code – V1.1	UEP06 Unit Title – V1.1	E = Equivalent N = Not Equivalent
	Removed	UEPOPS201A	Comply with Occupational Health and Safety Policy and Procedures	
UEPOPS202B	Apply Quality Systems To Work	UEPOPS202A	Apply Quality Systems To Work	E
UEPOPS203B	Operate and Monitor Communications Systems	UEPOPS203A	Operate and Monitor Communications Systems	E
UEPOPS204B	Maintain and Utilise Records	UEPOPS204A	Maintain and Utilise Records	E
UEPOPS205B	Conduct Minor Mechanical Maintenance	UEPOPS205A	Conduct Minor Mechanical Maintenance	E
UEPOPS206B	Conduct Minor Electrical Maintenance	UEPOPS206A	Conduct Minor Electrical Maintenance	E
UEPOPS207B	Perform Plant Lubrication	UEPOPS207A	Perform Plant Lubrication	E
		UEPOPS208A	Operate Local Systems	E
UEPOPS209B	Perform Process Plant Inspections	UEPOPS209A	Perform Process Plant Inspections	E
UEPOPS210B	Conduct First Response within a Workplace Team	UEPOPS210A	Conduct First Response within a Workplace Team	E

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UEPOPS211B	Clean Plant and Equipment	UEPOPS211A	Clean Plant and Equipment	E
	Removed	UEPOPS212A	Perform Basic Rigging Work	
	Removed	UEPOPS213A	Perform Intermediate Rigging Work	
	Removed	UEPOPS214A	Perform Dogging Work	
	Removed	UEPOPS215A	Perform Basic Scaffolding	
	Removed	UEPOPS216A	Perform Intermediate Scaffolding	
	Removed	UEPOPS217A	Conduct Elevating Work Platform Operations	
	Removed	UEPOPS218A	Shift and Transfer Materials using a Bulldozer	
	Removed	UEPOPS219A	Shift and Transfer Materials using a Grader	
	Removed	UEPOPS220A	Shift and Transfer Materials using a Scraper	
	Removed	UEPOPS221A	Shift and Transfer Materials using a Front end loader	
	Removed	UEPOPS222A	Shift and Transfer Materials using a Skidsteer loader	
	Removed	UEPOPS223A	Shift and Transfer Materials using a Telescopic materials handler-loader	
	Removed	UEPOPS224A	Shift and Transfer Materials using a Backhoe	
	Removed	UEPOPS225A	Shift and Transfer Materials using an Excavator	

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	Removed	UEPOPS226A	Shift and Transfer Materials using Bobcats – wheeled and tracked	
	Removed	UEPOPS227A	Shift and Transfer Materials using Borers and related attachments	
	Removed	UEPOPS228A	Conduct Forklift Operations	
	Removed	UEPOPS229A	Operate Lifting and Load Shifting Equipment for loads less than ten tonnes	
	Removed	UEPOPS230A	Operate Lifting and Load Shifting Equipment for loads greater than ten tonnes	
	Removed	UEPOPS231A	Operate Explosive Powered Tools	
UEPOPS232B	Transport Plant and Equipment	UEPOPS232A	Transport Plant and Equipment	E
	Removed	UEPOPS233A	Perform Machining Operations	
	Removed	UEPOPS234A	Perform Routine Oxyacetylene (fuel Gas) Welding (OAW)	
	Removed	UEPOPS235A	Perform Routine Manual Arc Welding	
	Removed	UEPOPS236A	Perform Manual Heating, Thermal Cutting and Gouging	
UEPOPS237B	Perform Tool Store Duties	UEPOPS237A	Perform Tool Store Duties	E
UEPOPS238B	Maintain Battery Banks and Cells	UEPOPS238A	Maintain Battery Banks and Cells	E
	Removed	UEPOPS239A	Conduct Minor/Basic Electrical Maintenance	
UEPOPS240B	Operate and Monitor Fuel Supply (Coal)	UEPOPS240A	Operate and Monitor Fuel Supply (Coal)	E

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UEPOPS241B	Operate and Monitor Ash and Dust Disposal Plant	UEPOPS241A	Operate and Monitor Ash and Dust Disposal Plant	E
UEPOPS242B	Operate and Monitor Dust Collection Plant	UEPOPS242A	Operate and Monitor Dust Collection Plant	E
UEPOPS243B	Operate Air Conditioning Plant	UEPOPS243A	Operate Air Conditioning Plant	E
UEPOPS244B	Operate and Monitor Site Services Water Systems	UEPOPS244A	Operate and Monitor Site Services Water Systems	E
UEPOPS245B	Conduct Chemical Batching Operations	UEPOPS245A	Conduct Chemical Batching Operations	E
UEPOPS246B	Operate Waste and Contaminated Water Plant	UEPOPS246A	Operate Waste and Contaminated Water Plant	E
UEPOPS247B	Operate and Monitor an Internal Combustion Single Fuel Reciprocating Engine	UEPOPS247A	Operate and Monitor an Internal Combustion Single Fuel Reciprocating Engine	E
UEPOPS248B	Operate and Monitor an Internal Combustion Dual Fuel Reciprocating Engine	UEPOPS248A	Operate and Monitor an Internal Combustion Dual Fuel Reciprocating Engine	E
UEPOPS249B	Liaise with Stakeholders	UEPOPS249A	Liaise with Stakeholders	E
	Removed	UEPOPS250A	Perform Process Plant Inspections	
UEPOPS251A	Conduct Routine Wind Turbine Maintenance		New Unit	
UEPOPS252A	Undertake Local Systems Operations		New Unit	

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Power Generation Operations AQF 3 Competency Standard Units

UEP12 Version 1 Unit Code	UEP12 Version 1 Unit Title	UEP06 Unit Code – V1.1	UEP06 Unit Title – V1.1	E = Equivalent N = Not Equivalent
UEPOPS301B	Conduct Single Energy Source Isolation Procedures for Permit to Work	UEPOPS301A	Conduct Single Energy Source Isolation Procedures for Permit to Work	E
	Removed	UEPOPS302A	Perform Advanced Rigging Work	
	Removed	UEPOPS303A	Perform Advanced Scaffolding	
UEPOPS304B	Make and Spread a Stockpile	UEPOPS304A	Make and Spread a Stockpile	E
UEPOPS305B	Operate & Monitor Briquette Coal Cooling Plant	UEPOPS305A	Operate & Monitor Briquette Coal Cooling Plant	E
UEPOPS306B	Operate & Monitor Briquette Coal Drying Plant	UEPOPS306A	Operate & Monitor Briquette Coal Drying Plant	E
UEPOPS307B	Operate & Monitor Briquette Coal Press Plant	UEPOPS307A	Operate & Monitor Briquette Coal Press Plant	E
UEPOPS308B	Perform Briquette Laboratory Tests	UEPOPS308A	Perform Briquette Laboratory Tests	E
UEPOPS309B	Operate and Monitor Air Conditioning Equipment and Ventilation Systems	UEPOPS309A	Operate and Monitor Air Conditioning Equipment and Ventilation Systems	E
UEPOPS310B	Operate Bulk Coal Handling Plant	UEPOPS310A	Operate Bulk Coal Handling Plant	E
UEPOPS311B	Operate Fabric Filter Dust Collection Plant	UEPOPS311A	Operate Fabric Filter Dust Collection Plant	E

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UEPOPS312B	Operate and Monitor Fuel Supply	UEPOPS312A	Operate and Monitor Fuel Supply	E
UEPOPS313B	Operate and Monitor Boiler Draught System	UEPOPS313A	Operate and Monitor Boiler Draught System	E
UEPOPS314B	Operate and Monitor Fuel Firing Plant (Gas or Oil)	UEPOPS314A	Operate and Monitor Fuel Firing Plant (Gas or Oil)	E
UEPOPS315B	Operate and Monitor Fuel Firing Plant (Coal)	UEPOPS315A	Operate and Monitor Fuel Firing Plant (Coal)	E
UEPOPS316B	Operate and Monitor Boiler Steam/Water Cycle	UEPOPS316A	Operate and Monitor Boiler Steam/Water Cycle	E
UEPOPS317B	Operate and Monitor Fixed Fire Protection Systems	UEPOPS317A	Operate and Monitor Fixed Fire Protection Systems	E
UEPOPS318B	Operate and Monitor Compressed Gas Systems	UEPOPS318A	Operate and Monitor Compressed Gas Systems	E
UEPOPS319B	Operate and Monitor Gas Production Plant	UEPOPS319A	Operate and Monitor Gas Production Plant	E
UEPOPS320B	Operate and Monitor Compressed Air Systems	UEPOPS320A	Operate and Monitor Compressed Air Systems	E
UEPOPS321B	Operate and Monitor Water Treatment Plant	UEPOPS321A	Operate and Monitor Water Treatment Plant	E
UEPOPS322B	Operate and Monitor Alkalinity Reduction Plant	UEPOPS322A	Operate and Monitor Alkalinity Reduction Plant	E
UEPOPS323B	Operate and Monitor Reverse Osmosis Plant	UEPOPS323A	Operate and Monitor Reverse Osmosis Plant	E
UEPOPS324B	Operate and Monitor Brine Concentrator Plant	UEPOPS324A	Operate and Monitor Brine Concentrator Plant	E

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UEPOPS325B	Operate and Monitor Water Quality Control Systems	UEPOPS325A	Operate and Monitor Water Quality Control Systems	E
UEPOPS326B	Operate and Monitor Oil Systems	UEPOPS326A	Operate and Monitor Oil Systems	E
UEPOPS327B	Monitor and Maintain Civil Assets	UEPOPS327A	Monitor and Maintain Civil Assets	E
UEPOPS328B	Undertake Dam Safety Surveillance	UEPOPS328A	Undertake Dam Safety Surveillance	E
UEPOPS329B	Operate and Monitor Auxiliary Steam Systems	UEPOPS329A	Operate and Monitor Auxiliary Steam Systems	E
UEPOPS330B	Operate and Monitor Heat Exchangers	UEPOPS330A	Operate and Monitor Heat Exchangers	E
UEPOPS331B	Operate and Monitor Water Systems (Condensate & Feedwater)	UEPOPS331A	Operate and Monitor Water Systems (Condensate & Feedwater)	E
UEPOPS332B	Operate and Monitor Condensing and Cooling Water System	UEPOPS332A	Operate and Monitor Condensing and Cooling Water System	E
UEPOPS333B	Operate and Monitor H.R.S.G. Hot Gas Control System	UEPOPS333A	Operate and Monitor H.R.S.G. Hot Gas Control System	E
UEPOPS334B	Operate and Monitor a Wind Generator	UEPOPS334A	Operate and Monitor a Wind Generator	E
UEPOPS335B	Operate A Hydro Generator/Synchronous Condenser / Pump Unit	UEPOPS335A	Operate A Hydro Generator/Synchronous Condenser / Pump Unit	E
UEPOPS336B	Manage Operate and Monitor a Gas Turbine Unit	UEPOPS336A	Manage Operate and Monitor a Gas Turbine Unit	E
UEPOPS337B	Maintain Quality Systems within the Team	UEPOPS337A	Maintain Quality Systems within the Team	E
UEPOPS338B	Facilitate Effective Workplace Communication	UEPOPS338A	Facilitate Effective Workplace Communication	E
UEPOPS339B	Operate and Monitor a Boiler Unit	UEPOPS339A	Operate and Monitor a Boiler Unit	E

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UEPOPS340B	Operate and Monitor a Steam Turbine	UEPOPS340A	Operate and Monitor a Steam Turbine	E
	Removed	UEPOPS341A	Shut Down a Steam Turbine	
UEPOPS342B	Interpret and Analyse Single Operation Protection Devices	UEPOPS342A	Interpret and Analyse Single Operation Protection Devices	E
UEPOPS343B	Operate Hydro-Electric Generating Plant and Auxiliary Equipment	UEPOPS343A	Operate Hydro-Electric Generating Plant and Auxiliary Equipment	E
UEPOPS344B	Conduct Water Conveyance and Control	UEPOPS344A	Conduct Water Conveyance and Control	E
UEPOPS345B	Implement Dam Safety Surveillance Procedures	UEPOPS345A	Implement Dam Safety Surveillance Procedures	E
UEPOPS346B	Conduct Non-Routine Operational Testing	UEPOPS346A	Conduct Non-Routine Operational Testing	E
UEPOPS347B	Operate and Monitor Supervisory, Control and Data Acquisition Systems	UEPOPS347A	Operate and Monitor Supervisory, Control and Data Acquisition Systems	E
	Removed	UEPOPS348A	Respond to Critical Incidents	
UEPOPS349B	Operate H.V. Primary Switchgear	UEPOPS349A	Operate H.V. Primary Switchgear	E
	Removed	UEPOPS350A	Develop Contingency Plans	
UEPOPS351B	Operate H.V. Condition Changing Apparatus	UEPOPS351A	Operate H.V. Condition Changing Apparatus	E
UEPOPS352B	Conduct Operational Checks on In-Service Mechanical Plant	UEPOPS352A	Conduct Operational Checks on In-Service Mechanical Plant	E
UEPOPS354B	Operate and Monitor Dual Fuel-Firing Plant	UEPOPS354A	Operate and Monitor Dual Fuel-Firing Plant	E
UEPOPS355B	Monitor the Implementation of Under Frequency Load Shedding	UEPOPS355A	Monitor the Implementation of Under Frequency Load Shedding	E

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UEPOPS356B	Apply Environmental and Sustainable Energy Procedures	UEPOPS356A	Apply Environmental and Sustainable Energy Procedures	E
UEPOPS357B	Operate H.V. Secondary Switchgear	UEPOPS357A	Operate H.V. Secondary Switchgear	E
UEPOPS358A	Monitor and Maintain Wind Farm Civil Assets		New Unit	
UEPOPS359A	Monitor Climatic Conditions for Renewable Energy Production		New Unit	
UEPOPS360A	Operate and Monitor a Hydro Turbine		New Unit	
UEPOPS361A	Operate and Monitor Hydro Plant Auxiliary Systems		New Unit	
UEPOPS362A	Operate and Monitor Generator/Alternator		New Unit	
UEPOPS364A	Ensure Compliance with Occupational Health and Safety policy and procedures		New Unit	
UEPOPS368A	Operate manual systems		New Unit	
UEPOPS369A	Respond to a critical incident		New Unit	
UEPOPS370A	Facilitate the use of contingency plans		New Unit	
UEPOPS371A	Carry out operational checks on in-service electrical plant	UEPOPS353A	Conduct Operational Checks on In-Service Electrical Plant	E

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Power Generation Maintenance AQF 3 Competency Standard Units

UEP12 Version 1 Unit Code	UEP12 Version 1 Unit Title	UEP06 Unit Code – V1.1	UEP06 Unit Title – V1.1	E = Equivalent N = Not Equivalent
	Removed	UEPMNT301A	Install and Maintain Hydraulic / Pneumatic Components	
UEPMNT302B	Install and Maintain Industrial Pipework	UEPMNT302A	Install and Maintain Industrial Pipework	E
UEPMNT303B	Maintain Mechanical Valves	UEPMNT303A	Maintain Mechanical Valves	E
UEPMNT304B	Maintain Mechanical Pumps	UEPMNT304A	Maintain Mechanical Pumps	E
UEPMNT305B	Maintain Industrial Fans	UEPMNT305A	Maintain Industrial Fans	E
	Removed	UEPMNT306A	Maintain Industrial Transmissions	
UEPMNT307B	Maintain Industrial Screens, Strainers and Filters	UEPMNT307A	Maintain Industrial Screens, Strainers and Filters	E
UEPMNT308B	Maintain Conveyors and Associated Equipment	UEPMNT308A	Maintain Conveyors and Associated Equipment	E
UEPMNT309B	Maintain Material Feeders	UEPMNT309A	Maintain Material Feeders	E
UEPMNT310B	Maintain Material Crushers	UEPMNT310A	Maintain Material Crushers	E
UEPMNT311B	Maintain Fuel Transport Equipment	UEPMNT311A	Maintain Fuel Transport Equipment	E
UEPMNT312B	Maintain Industrial Pressure Vessels	UEPMNT312A	Maintain Industrial Pressure Vessels	E
UEPMNT313B	Maintain Internal Combustion	UEPMNT313A	Maintain Internal Combustion Engines	E

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	Engines			
UEPMNT314B	Maintain Hydro Turbines	UEPMNT314A	Maintain Hydro Turbines	E
UEPMNT315B	Maintain Wind Turbines	UEPMNT315A	Maintain Wind Turbines	E
	Removed	UEPMNT316A	Perform Advanced Machining Operations	
UEPMNT317B	Diagnose and Repair Faults in Mechanical Equipment	UEPMNT317A	Diagnose and Repair Faults in Mechanical Equipment	E
UEPMNT318B	Conduct Generator Mechanical Maintenance	UEPMNT318A	Conduct Generator Mechanical Maintenance	E
UEPMNT319B	Maintain and Test Fixed Fire Protection Systems	UEPMNT319A	Maintain and Test Fixed Fire Protection Systems	E
UEPMNT320B	Inspect and Repair/Replace Faults in Mechanical Equipment/Components	UEPMNT320A	Inspect and Repair/Replace Faults in Mechanical Equipment/Components	E
	Removed	UEPMNT321A	Weld using Manual Metal Arc Welding Process (MMAW)	
	Removed	UEPMNT322A	Weld using Gas Metal Arc Welding Process (GMAW)	
	Removed	UEPMNT323A	Weld using Gas Tungsten Arc Welding Process (GTAW)	
	Removed	UEPMNT324A	Weld using Oxyacetylene Welding Process (OAW)	
	Removed	UEPMNT325A	Weld using Submerged Arc Welding Process (SAW)	
	Removed	UEPMNT326A	Perform Advanced Welding using Manual Metal Arc Welding Process (MMAW)	

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	Removed	UEPMNT327A	Perform Advanced Welding using Gas Metal Arc Welding (GMAW)	
	Removed	UEPMNT328A	Perform Advanced Welding using Gas Tungsten Arc Welding (GTAW)	
	Removed	UEPMNT329A	Perform Advanced Welding using Oxyacetylene Welding Process (OAW)	
	Removed	UEPMNT330A	Perform Manual Metal Arc Welding Process to Weld to AS1796 Certificate 1/1E (Low Carbon Steel Sheet and Plate)	
	Removed	UEPMNT331A	Perform Manual Metal Arc Welding Process to Weld to AS1796 Certificate 2 (Low Carbon Steel Pipe)	
	Removed	UEPMNT332A	Perform Manual Metal Arc Welding to Weld to AS1796 Certificate 3/3E (Alloy Steel Plate)	
	Removed	UEPMNT333A	Perform Manual Metal Arc Welding Process to Weld to AS1796 Certificate 4 (Alloy Steel Pipe)	
	Removed	UEPMNT334A	Perform Gas Tungsten Arc Welding and Manual Metal Arc Welding Processes to Weld to AS1796 Certificate 5 (Alloy Steel Pipe)	
	Removed	UEPMNT335A	Perform Oxyacetylene Welding Process (Fuel Gas) to AS1796 Certificate 6/6E	
	Removed	UEPMNT336A	Perform Gas Tungsten Arc Welding to Weld to AS1796 Certificate 7 (Pipe)	
	Removed	UEPMNT337A	Perform Gas Metal Arc Welding to Weld to AS1796 Certificate 8/8E (Plate and Pipe)	

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	Removed	UEPMNT338A	Perform Submerged Arc Welding to Weld to AS1796 Certificate 9	
UEPMNT339B	Perform sheet metal work	UEPMNT339A	Perform sheet metal work	E
UEPMNT340B	Fabricate metal structures and components	UEPMNT340A	Fabricate metal structures and components	E
	Removed	UEPMNT341A	Repair/Replace/Modify metal structures and components	
	Removed	UEPMNT342A	Install electrical equipment	
	Removed	UEPMNT343A	Install electrical wiring systems	
	Removed	UEPMNT344A	Install complex electrical equipment	E
UEPMNT345B	Install electronic electrical equipment	UEPMNT345A	Install electronic electrical equipment	E
UEPMNT346B	Maintain electrical equipment	UEPMNT346A	Maintain electrical equipment	E
UEPMNT347B	Maintain complex electrical equipment	UEPMNT347A	Maintain complex electrical equipment	E
UEPMNT348B	Maintain electrical electronic equipment	UEPMNT348A	Maintain electrical electronic equipment	E
	Removed	UEPMNT349A	Diagnose and repair faults in electrical equipment	
UEPMNT350B	Modify electrical equipment	UEPMNT350A	Modify electrical equipment	E
UEPMNT351B	Test and commission electrical equipment	UEPMNT351A	Test and commission electrical equipment	E
UEPMNT352B	Test and commission electronic electrical equipment	UEPMNT352A	Test and commission electronic electrical equipment	E

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	Removed	UEPMNT353A	Install instrumentation equipment	
	Removed	UEPMNT354A	Install instrumentation wiring systems	
UEPMNT355B	Install complex/electronic instrumentation equipment	UEPMNT355A	Install complex/electronic instrumentation equipment	E
UEPMNT356B	Maintain instrumentation equipment	UEPMNT356A	Maintain instrumentation equipment	E
UEPMNT357B	Diagnose and repair faults in instrumentation equipment	UEPMNT357A	Diagnose and repair faults in instrumentation equipment	E
UEPMNT358B	Modify instrumentation equipment	UEPMNT358A	Modify instrumentation equipment	E
UEPMNT359B	Test and Commission Instrumentation Systems	UEPMNT359A	Test and Commission Instrumentation Systems	E
	Removed	UEPMNT360A	Terminate fibre optic cables	
UEPMNT361A	Maintain Wind Turbine Mechanical Systems		New Unit	
UEPMNT362A	Maintain Wind Turbine Control Systems		New Unit	
UEPMNT366A	Maintain power plant inverter systems		New Unit	

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Power Generation Operations AQF 4 Competency Standard Units

UEP12 Version 1 Unit Code	UEP12 Version 1 Unit Title	UEP06 Unit Code – V1.1	UEP06 Unit Title – V1.1	E = Equivalent N = Not Equivalent
	Removed	UEPOPS401A	Monitor Compliance with Occupational Health and Safety Policy and Procedures	
UEPOPS402B	Conduct Multiple Energy Source Isolation Procedures for Permit to Work	UEPOPS402A	Conduct Multiple Energy Source Isolation Procedures for Permit to Work	E
UEPOPS403B	Coordinate Permit to Work System	UEPOPS403A	Coordinate Permit to Work System	E
UEPOPS404B	Coordinate First Response Team Operation	UEPOPS404A	Coordinate First Response Team Operation	E
UEPOPS405B	Operate and Monitor AC Electrical Systems	UEPOPS405A	Operate and Monitor AC Electrical Systems	E
UEPOPS406B	Operate and Monitor DC Electrical Systems	UEPOPS406A	Operate and Monitor DC Electrical Systems	E
UEPOPS407B	Start and Run Up A Gas Turbine	UEPOPS407A	Start and Run Up A Gas Turbine	E
UEPOPS408B	Shut Down a Gas Turbine	UEPOPS408A	Shut Down a Gas Turbine	E
UEPOPS409B	Start-Up A Boiler Unit	UEPOPS409A	Start-Up A Boiler Unit	E
UEPOPS410B	Shut Down A Boiler Unit	UEPOPS410A	Shut Down A Boiler Unit	E
UEPOPS411B	Run Up A Steam Turbine	UEPOPS411A	Run Up A Steam Turbine	E
UEPOPS412B	Undertake Operations Commissioning / Decommissioning	UEPOPS412A	Undertake Operations Commissioning / Decommissioning	E
UEPOPS413B	Coordinate Operational Strategies for Power Production	UEPOPS413A	Coordinate Operational Strategies for Power Production	E

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UEPOPS414B	Perform Risk Analysis of Generation Plant	UEPOPS414A	Perform Risk Analysis of Generation Plant	E
	Removed	UEPOPS415A	Perform Cost Estimations	
UEPOPS416B	Monitor the Implementation of the Enterprise's Production / Maintenance Quality Control procedures	UEPOPS416A	Monitor the Implementation of the Enterprise's Production / Maintenance Quality Control procedures	E
UEPOPS417B	Monitor and Implement Environmental Plans and Procedures	UEPOPS417A	Monitor and Implement Environmental Plans and Procedures	E
	Removed	UEPOPS418A	Deliver and Review Training	
UEPOPS419B	Shut down a steam turbine	UEPOPS419A	Reserved	E
UEPOPS420B	Coordinate the Network/System	UEPOPS420A	Coordinate the Network/System	E
	Removed	UEPOPS421A	Manage Critical Incidents	
UEPOPS422B	Schedule Generation	UEPOPS422A	Schedule Generation	E
UEPOPS423B	Plan a Scheduled Outage	UEPOPS423A	Plan a Scheduled Outage	E
UEPOPS424B	Coordinate Local H.V. Networks	UEPOPS424A	Coordinate Local H.V. Networks	E
UEPOPS425B	Produce Maintenance Plans For Generation Production Plant	UEPOPS425A	Produce Maintenance Plans For Generation Production Plant	E
UEPOPS426B	Interpret and Analyse Multi-Operation Protection Devices	UEPOPS426A	Interpret and Analyse Multi-Operation Protection Devices	E
	Removed	UEPOPS427A	Interpret and Analyse Low Voltage and Mechanical Protection Devices	
UEPOPS428B	Develop H.V. Switching Programs	UEPOPS428A	Develop H.V. Switching Programs	E
	Removed	UEPOPS429A	Coordinate and Direct Switching Program	

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UEPOPS430B	Control Permit to Work Operations	UEPOPS430A	Control Permit to Work Operations	E
UEPOPS431B	Collect and Analyse Hydrological and Meteorological Data	UEPOPS431A	Collect and Analyse Hydrological and Meteorological Data	E
UEPOPS432B	Start up a Heat Recovery Steam Generator Unit	UEPOPS432A	Start up a Heat Recovery Steam Generator Unit	E
UEPOPS433B	Operate and Monitor a Heat Recovery Steam Generator Unit	UEPOPS433A	Operate and Monitor a Heat Recovery Steam Generator Unit	E
UEPOPS434B	Shutdown an Heat Recovery Steam Generator Unit	UEPOPS434A	Shutdown an Heat Recovery Steam Generator Unit	E
UEPOPS435B	Operate and Monitor Flue Gas NOx Mitigation Systems	UEPOPS435A	Operate and Monitor Flue Gas NOx Mitigation Systems	E
	Removed	UEPOPS436A	Operate and Monitor Dual Fuel Firing Plant	
UEPOPS437B	Manage System Re-Start	UEPOPS437A	Manage System Re-Start	E
	Removed	UEPOPS438A	Coordinate Electrical Energy Production	
UEPOPS439B	Plan and Organise Work	UEPOPS439A	Plan and Organise Work	E
UEPOPS440B	Co-ordinate Team Activities	UEPOPS440A	Co-ordinate Team Activities	E
UEPOPS441B	Operate and Monitor System Equipment	UEPOPS441A	Operate and Monitor System Equipment	E
UEPOPS442B	Monitor and Co-ordinate the Operation of a Combined Cycle Gas Turbine Unit	UEPOPS442A	Monitor and Co-ordinate the Operation of a Combined Cycle Gas Turbine Unit	E
UEPOPS443A	Coordinate Wind Farm Operations		New Unit	
UEPOPS444A	Start and Run-up a Hydro Turbine		New Unit	
UEPOPS445A	Shut Down a Hydro Turbine		New Unit	

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UEPOPS446A	Operate and monitor hydro unit control and protection systems		New Unit	
UEPOPS447A	Coordinate photovoltaic solar power plant operations		New Unit	
UEPOPS450A	Coordinate effective workplace communication		New Unit	
UEPOPS451A	Coordinate the use of contingency plans		New Unit	
UEPOPS452A	Conduct operational checks and carry out corrective action on in-service electrical plant		New Unit	
UEPOPS454A	Coordinate response to critical incidents		New Unit	
UEPOPS456A	Perform switching to a switching program		New Unit	
UEPOPS457A	Control electrical energy production		New Unit	

Power Generation Maintenance AQF 4 Competency Standard Units

UEP12 Version 1 Unit Code	**UEP12 Version 1 Unit Title**	**UEP06 Unit Code – V1.1**	**UEP06 Unit Title – V1.1**	**E = Equivalent** **N = Not Equivalent**
UEPMNT401B	Install and Maintain Complex Mechanical Seals	UEPMNT401A	Install and Maintain Complex Mechanical Seals	E
UEPMNT402B	Conduct Complex Levelling and	UEPMNT402A	Conduct Complex Levelling and Alignment	E

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	Alignment			
UEPMNT403B	Maintain Complex Mechanical Valves	UEPMNT403A	Maintain Complex Mechanical Valves	E
UEPMNT404B	Maintain Complex Mechanical Pumps	UEPMNT404A	Maintain Complex Mechanical Pumps	E
		UEPMNT405A	Maintain Fluid Power Systems	E
UEPMNT406B	Install and Maintain a Steam Turbine	UEPMNT406A	Install and Maintain a Steam Turbine	E
UEPMNT407B	Install and Maintain a Gas Turbine	UEPMNT407A	Install and Maintain a Gas Turbine	E
UEPMNT408B	Install Hydro Turbines	UEPMNT408A	Install Hydro Turbines	E
	Removed	UEPMNT409A	Conduct Welding Inspection/Supervision	
UEPMNT410B	Diagnose and Repair Faults in Electronic Equipment	UEPMNT410A	Diagnose and Repair Faults in Electronic Equipment	E
UEPMNT411B	Diagnose and Repair Faults in Complex Electrical Equipment	UEPMNT411A	Diagnose and Repair Faults in Complex Electrical Equipment	E
UEPMNT412B	Modify Complex Electrical Equipment	UEPMNT412A	Modify Complex Electrical Equipment	E
UEPMNT413B	Modify Electronic Electrical Equipment	UEPMNT413A	Modify Electronic Electrical Equipment	E
UEPMNT414B	Test and Commission Complex Electrical Equipment	UEPMNT414A	Test and Commission Complex Electrical Equipment	E
UEPMNT415B	Diagnose and Repair Faults in Complex Refrigeration / Air Conditioning Equipment	UEPMNT415A	Diagnose and Repair Faults in Complex Refrigeration / Air Conditioning Equipment	E
UEPMNT416B	Overhaul Electrical Generators	UEPMNT416A	Overhaul Electrical Generators	E
UEPMNT417B	Inspect Electrical Generators and Diagnose Faults	UEPMNT417A	Inspect Electrical Generators and Diagnose Faults	E

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	Removed	UEPMNT418A	Perform Mechanical and Fabrication Drafting	
UEPMNT419B	Perform Civil Drafting	UEPMNT419A	Perform Civil Drafting	E
	Removed	UEPMNT420A	Perform Electrical/Electronic Drafting	
UEPMNT421B	Conduct Technical Inspection of Process Plant and Equipment	UEPMNT421A	Conduct Technical Inspection of Process Plant and Equipment	E
UEPMNT422B	Conduct Performance Testing on Process Plant and Equipment	UEPMNT422A	Conduct Performance Testing on Process Plant and Equipment	E
	Removed	UEPMNT423A	Conduct/Implement Condition Monitoring	
UEPMNT424B	Monitor Efficiency of Thermal Steam Cycle Power Plant	UEPMNT424A	Monitor Efficiency of Thermal Steam Cycle Power Plant	E
UEPMNT425B	Maintain Complex Instrumentation Equipment	UEPMNT425A	Maintain Complex Instrumentation Equipment	E
UEPMNT426B	Maintain Electronic Instrumentation Equipment	UEPMNT426A	Maintain Electronic Instrumentation Equipment	E
UEPMNT427B	Diagnose and Repair Faults in Complex Instrumentation Equipment	UEPMNT427A	Diagnose and Repair Faults in Complex Instrumentation Equipment	E
UEPMNT428B	Modify Complex Instrumentation Equipment	UEPMNT428A	Modify Complex Instrumentation Equipment	E
UEPMNT429B	Modify Electronic Instrumentation Equipment	UEPMNT429A	Modify Electronic Instrumentation Equipment	E
UEPMNT430B	Test and Commission Complex Instrumentation Equipment	UEPMNT430A	Test and Commission Complex Instrumentation Equipment	E
UEPMNT431B	Test and Commission Electronic Instrumentation Equipment	UEPMNT431A	Test and Commission Electronic Instrumentation Equipment	E

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UEPMNT432B	Write Programs for Control Systems	UEPMNT432A	Write Programs for Control Systems	E
UEPMNT433B	Conduct Routine Generation Electrical Maintenance	UEPMNT433A	Conduct Routine Generation Electrical Maintenance	E
UEPMNT434A	Diagnose and Repair Faults in Wind Turbine Control Systems		New Unit	
UEPMNT435A	Diagnose and Repair Faults in Wind Turbine Mechanical Systems		New Unit	
UEPMNT436A	Test and Commission Wind Turbine Control Systems		New Unit	
UEPMNT440A	Diagnose and repair faults in power plant inverter systems		New Unit	
UEPMNT441A	Test and commission power plant inverter systems		New Unit	

Power Generation Operation AQF 5 Competency Standard Units

UEP12 Version 1 Unit Code	**UEP12 Version 1 Unit Title**	**UEP06 Unit Code – V1.1**	**UEP06 Unit Title – V1.1**	**E = Equivalent** **N = Not Equivalent**
UEPOPS501B	Manage Occupational Health and Safety Policy and Procedures	UEPOPS501A	Manage Occupational Health and Safety Policy and Procedures	E
UEPOPS502B	Manage Permit to Work System	UEPOPS502A	Manage Permit to Work System	E

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	Removed	UEPOPS503A	Manage first response team operations	
	Removed	UEPOPS504A	Develop Implement and Monitor Environmental Management Systems	
UEPOPS505B	Produce maintenance strategies for generation production plant	UEPOPS505A	Produce maintenance strategies for generation production plant	E
	Removed	UEPOPS506A	Establish and Implement Operational Strategies for Power Production	
UEPOPS507B	Conduct project management	UEPOPS507A	Conduct project management	E
UEPOPS508B	Manage commissioning/ decommissioning	UEPOPS508A	Manage commissioning/ decommissioning	E
UEPOPS509B	Manage quality control procedures	UEPOPS509A	Manage quality control procedures	E
UEPOPS510B	Monitor power generation plant reliability	UEPOPS510A	Monitor power generation plant reliability	E
UEPOPS511B	Tune Process Plant and Equipment	UEPOPS511A	Tune Process Plant and Equipment	E
UEPOPS512B	Manage the Network/System	UEPOPS512A	Manage the Network/System	E
UEPOPS513B	Manage Operational Crisis to Maintain/Restore Power System Integrity	UEPOPS513A	Manage Operational Crisis to Maintain/Restore Power System Integrity	E
UEPOPS514B	Control hydro generation/pumping	UEPOPS514A	Control hydro generation/pumping	E
UEPOPS515B	Coordinate power generation	UEPOPS515A	Coordinate power generation	E
UEPOPS520A	Evaluate cost estimations and initiate appropriate solutions		New Unit	
UEPOPS523A	Manage critical incidents		New Unit	
UEPOPS524A	Evaluate the scheduling of generation		New Unit	
UEPOPS525A	Coordinate and direct switching program		New Unit	

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UEPOPS526A	Coordinate electrical energy production		New Unit	
UEPOPS527A	Manage first response team		New Unit	
UEPOPS528A	Manage environmental management systems		New Unit	
UEPOPS529A	Manage operational strategies for power production		New Unit	

Power Generation Maintenance AQF 5 Competency Standard Units

UEP12 Version 1 Unit Code	UEP12 Version 1 Unit Title	UEP06 Unit Code – V1.1	UEP06 Unit Title – V1.1	E = Equivalent N = Not Equivalent
UEPMNT501B	Diagnose and Repair Faults in Electrical and Electronic Systems	UEPMNT501A	Diagnose and Repair Faults in Electrical and Electronic Systems	E
UEPMNT502B	Test and Commission Electronic Electrical Systems	UEPMNT502A	Test and Commission Electronic Electrical Systems	E
UEPMNT503B	Diagnose and Repair Faults in Instrumentation Systems	UEPMNT503A	Diagnose and Repair Faults in Instrumentation Systems	E
UEPMNT504B	Test and Commission Instrumentation Systems	UEPMNT504A	Test and Commission Instrumentation Systems	E

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Table 2 — Mapping Units of Standard Competency to former Training Packages (UTP98 & UEP06 – Version 1) and Pre-requisites

Schedule 1 Units UEPOPS201A – UEPOPS250A

CODE	UNIT TITLE	Notional AQF Level	WEIGHTING POINTS	Prerequisites Unit *	UTP98 UNIT CODE	Equivalence - Full, part or not
UEPOPS201A	Comply with Occupational Health and Safety Policy and Procedures	2	30	None	UTPNEG001A	
UEPOPS202A	Apply Quality Systems To Work	2	30	None	UTPNEG204A	
UEPOPS203A	Operate and Monitor Communications Systems	2	30	None	UTPNEG268A	
UEPOPS204A	Maintain and Utilise Records	2	30	None	UTPNEG270A	
UEPOPS205A	Conduct Minor Mechanical Maintenance	2	30	None	UTPNEG079A	
UEPOPS206A	Conduct Minor Electrical Maintenance	2	30	None	UTPNEG136A	
UEPOPS207A	Perform Plant Lubrication	2	30	None	UTPNEG178A	
UEPOPS208A	Operate Local Systems	2	35	None	UTPNEG189A	
UEPOPS209A	Perform Process Plant Inspections	2	30	None	UTPNEG238A	
UEPOPS210A	Conduct First Response within a Workplace Team	2	40	None	UTPNEG007A	
UEPOPS211A	Clean Plant and Equipment	2	30	None	UTPNEG015A	
UEPOPS212A	Perform Basic Rigging Work	2	30	UEPOPS201A	UTPNEG016A	

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UEPOPS213A	Perform Intermediate Rigging Work	2	30	UEPOPS212A	UTPNEG017A	
UEPOPS214A	Perform Dogging Work	2	30	UEPOPS201A	UTPNEG019A	
UEPOPS215A	Perform Basic Scaffolding	2	30	UEPOPS201A	UTPNEG020A	
UEPOPS216A	Perform Intermediate Scaffolding	2	30	UEPOPS215A	UTPNEG021A	
UEPOPS217A	Conduct Elevating Work Platform Operations	2	30	UEPOPS201A	UTPNEG027B	
UEPOPS218A	Shift and Transfer Materials using a Bulldozer	2	40	UEPOPS201A	UTPNEG028Ba	
UEPOPS219A	Shift and Transfer Materials using a Grader	2	40	UEPOPS201A	UTPNEG028Ba	
UEPOPS220A	Shift and Transfer Materials using a Scraper	2	40	UEPOPS201A	UTPNEG028Bb	
UEPOPS221A	Shift and Transfer Materials using a Front end loader	2	40	UEPOPS201A	UTPNEG028Bc	
UEPOPS222A	Shift and Transfer Materials using a Skidsteer loader	2	40	UEPOPS201A	UTPNEG028Bd	
UEPOPS223A	Shift and Transfer Materials using a Telescopic materials handler-loader	2	40	UEPOPS201A	UTPNEG028Be	
UEPOPS224A	Shift and Transfer Materials using a Backhoe	2	40	UEPOPS201A	UTPNEG028Bf	
UEPOPS225A	Shift and Transfer Materials using an Excavator	2	40	UEPOPS201A	UTPNEG028Bg	
UEPOPS226A	Shift and Transfer Materials using Bobcats – wheeled and tracked	2	40	UEPOPS201A	UTPNEG028Bh	

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UEPOPS227A	Shift and Transfer Materials using Borers and related attachments	2	40	UEPOPS201A	UTPNEG028Bi	
UEPOPS228A	Conduct Forklift Operations	2	30	UEPOPS201A	UTPNEG029A	
UEPOPS229A	Operate Lifting and Load Shifting Equipment for loads less than ten tonnes	2	30	UEPOPS201A	UTPNEG030A	
UEPOPS230A	Operate Lifting and Load Shifting Equipment for loads greater than ten tonnes	2	35	UEPOPS229A	UTPNEG031A	
UEPOPS231A	Operate Explosive Powered Tools	2	30	UEPOPS201A	UTPNEG032A	
UEPOPS232A	Transport Plant and Equipment	2	30	UEPOPS201A	UTPNEG038A	
UEPOPS233A	Perform Machining Operations	2	35	None	UTPNEG080A	
UEPOPS234A	Perform Routine Oxyacetylene (fuel Gas) Welding (OAW)	2	35	None	UTPNEG080A	
UEPOPS235A	Perform Routine Manual Arc Welding	2	30	None	UTPNEG112A	
UEPOPS236A	Perform Manual Heating, Thermal Cutting and Gouging	2	30	None	UTPNEG113A	
UEPOPS237A	Perform Tool Store Duties	2	30	None	UTPNEG114A	
UEPOPS238A	Maintain Battery Banks and Cells	2	30	None	UTPNEG133A	Full
UEPOPS239A	Conduct Minor/Basic Electrical Maintenance	2	30	None	UTPNEG136A	Full
UEPOPS240A	Operate and Monitor Fuel Supply (Coal)	2	40	None	UTPNEG152A	Full

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UEPOPS241A	Operate and Monitor Ash and Dust Disposal Plant	2	40	None	UTPNEG153A	Full
UEPOPS242A	Operate and Monitor Dust Collection Plant	2	40	None	UTPNEG154A	Full
UEPOPS243A	Operate Air Conditioning Plant	2	30	None	UTPNEG163A	Full
UEPOPS244A	Operate and Monitor Site Services Water Systems	2	30	None	UTPNEG164A	Full
UEPOPS245A	Conduct Chemical Batching Operations	2	30	None	UTPNEG176A	Full
UEPOPS246A	Operate Waste and Contaminated Water Plant	2	35	None	UTPNEG177A	Full
UEPOPS247A	Operate and Monitor an Internal Combustion Single Fuel Reciprocating Engine	2	40	None	UTPNEG191A	Full
UEPOPS248A	Operate and Monitor an Internal Combustion Dual Fuel Reciprocating Engine	2	40	None	UTPNEG192A	Full
UEPOPS249A	Liaise with Stakeholders	2	30	None	UTPNEG269A	Full
UEPOPS250A	Perform Process Plant Inspections	2	35	None	UTPNEG238A	Full

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Schedule 3 Units UEPMNT301A – UEPMNT360A

CODE	UNIT TITLE	Notional AQF Level	WEIGHTING POINTS	Prerequisites Unit	UTP98 UNIT CODE	Equivalent - Full, part or not
UEPMNT301A	Install and Maintain Hydraulic / Pneumatic Components	3	90	Trade may apply	UTPNEG058A	Full
UEPMNT302A	Install and Maintain Industrial Pipework	3	90	Trade may apply	UTPNEG059A	Full
UEPMNT303A	Maintain Mechanical Valves	3	90	Trade may apply	UTPNEG062A	Full
UEPMNT304A	Maintain Mechanical Pumps	3	90	Trade may apply	UTPNEG064A	Full
UEPMNT305A	Maintain Industrial Fans	3	90	Trade may apply	UTPNEG066A	Full
UEPMNT306A	Maintain Industrial Transmissions	3	90	Trade may apply	UTPNEG067A	Full
UEPMNT307A	Maintain Industrial Screens, Strainers and Filters	3	90	Trade may apply	UTPNEG069A	Full
UEPMNT308A	Maintain Conveyors and Associated Equipment	3	90	Trade may apply	UTPNEG070A	Full
UEPMNT309A	Maintain Material Feeders	3	100	Trade may apply	UTPNEG071A	Full
UEPMNT310A	Maintain Material Crushers	3	100	Trade may apply	UTPNEG072A	Full

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UEPMNT311A	Maintain Fuel Transport Equipment	3	100	Trade may apply	UTPNEG073A	Full
UEPMNT312A	Maintain Industrial Pressure Vessels	3	100	Trade may apply	UTPNEG074A	Full
UEPMNT313A	Maintain Internal Combustion Engines	3	100	Trade may apply	UTPNEG076A	Full
UEPMNT314A	Maintain Hydro Turbines	3	100	UEPMNT402A	UTPNEG077A	Full
UEPMNT315A	Maintain Wind Turbines	3	100	UEPMNT402A	UTPNEG078A	Full
UEPMNT316A	Perform Advanced Machining Operations	3	100	Trade may apply	UTPNEG081A	Full
UEPMNT317A	Diagnose and Repair Faults in Mechanical Equipment	3	90	Trade may apply	UTPNEG082A	Full
UEPMNT318A	Conduct Generator Mechanical Maintenance	3	100	Trade may apply	UTPNEG083A	Full
UEPMNT319A	Maintain and Test Fixed Fire Protection Systems	3	90	Trade may apply	UTPNEG084A	Full
UEPMNT320A	Inspect and Repair/Replace Faults in Mechanical Equipment/Components	3	90	Trade may apply	UTPNEG085A	Full
UEPMNT321A	Weld using Manual Metal Arc Welding Process (MMAW)	3	80	Trade may apply	UTPNEG090A	Full
UEPMNT322A	Weld using Gas Metal Arc Welding Process (GMAW)	3	80	Trade may apply	UTPNEG091A	Full
UEPMNT323A	Weld using Gas Tungsten Arc Welding Process (GTAW)	3	80	Trade may apply	UTPNEG092A	Full

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UEPMNT324A	Weld using Oxyacetylene Welding Process (OAW)	3	80	Trade may apply	UTPNEG093A	Full
UEPMNT325A	Weld using Submerged Arc Welding Process (SAW)	3	80	Trade may apply	UTPNEG094A	Full
UEPMNT326A	Perform Advanced Welding using Manual Metal Arc Welding Process (MMAW)	3	80	Trade may apply	UTPNEG095A	Full
UEPMNT327A	Perform Advanced Welding using Gas Metal Arc Welding (GMAW)	3	80	Trade may apply	UTPNEG096A	Full
UEPMNT328A	Perform Advanced Welding using Gas Tungsten Arc Welding (GTAW)	3	80	Trade may apply	UTPNEG097A	Full
UEPMNT329A	Perform Advanced Welding using Oxyacetylene Welding Process (OAW)	3	80	Trade may apply	UTPNEG098A	Full
UEPMNT330A	Perform Manual Metal Arc Welding Process to Weld to AS1796 Certificate 1/1E (Low Carbon Steel Sheet and Plate)	3	80	Trade may apply	UTPNEG099A	Full
UEPMNT331A	Perform Manual Metal Arc Welding Process to Weld to AS1796 Certificate 2 (Low Carbon Steel Pipe)	3	80	Trade may apply	UTPNEG100A	Full
UEPMNT332A	Perform Manual Metal Arc Welding to Weld to AS1796 Certificate 3/3E (Alloy Steel Plate)	3	80	Trade may apply	UTPNEG101A	Full
UEPMNT333A	Perform Manual Metal Arc Welding Process to Weld to AS1796	3	80	Trade may apply	UTPNEG102A	Full

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	Certificate 4 (Alloy Steel Pipe)					
UEPMNT334A	Perform Gas Tungsten Arc Welding and Manual Metal Arc Welding Processes to Weld to AS1796 Certificate 5 (Alloy Steel Pipe)	3	80	Trade may apply	UTPNEG103A	Full
UEPMNT335A	Perform Oxyacetylene Welding Process (Fuel Gas) to AS1796 Certificate 6/6E	3	80	Trade may apply	UTPNEG104A	Full
UEPMNT336A	Perform Gas Tungsten Arc Welding to Weld to AS1796 Certificate 7 (Pipe)	3	80	Trade may apply	UTPNEG105A	Full
UEPMNT337A	Perform Gas Metal Arc Welding to Weld to AS1796 Certificate 8/8E (Plate and Pipe)	3	80	Trade may apply	UTPNEG106A	Full
UEPMNT338A	Perform Submerged Arc Welding to Weld to AS1796 Certificate 9	3	80	Trade may apply	UTPNEG107A	Full
UEPMNT339A	Perform sheet metal work	3	100	Trade may apply	UTPNEG108A	Full
UEPMNT340A	Fabricate metal structures and components	3	100	Trade may apply	UTPNEG109A	Full
UEPMNT341A	Repair/Replace/Modify metal structures and components	3	100	Trade may apply	UTPNEG110A	Full
UEPMNT342A	Install electrical equipment	3	90	Trade may apply	UTPNEG115A	Full
UEPMNT343A	Install electrical wiring systems	3	90	Trade may	UTPNEG116A	Full

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				apply		
UEPMNT344A	Install complex electrical equipment	3	90	Trade may apply	UTPNEG117A	Full
UEPMNT345A	Install electronic electrical equipment	3	90	Trade may apply	UTPNEG118A	Full
UEPMNT346A	Maintain electrical equipment	3	90	Trade may apply	UTPNEG119A	Full
UEPMNT347A	Maintain complex electrical equipment	3	90	Trade may apply	UTPNEG120A	Full
UEPMNT348A	Maintain electrical electronic equipment	3	90	Trade may apply	UTPNEG121A	Full
UEPMNT349A	Diagnose and repair faults in electrical equipment	3	90	Trade may apply	UTPNEG122A	Full
UEPMNT350A	Modify electrical equipment	3	90	Trade may apply	UTPNEG126A	Full
UEPMNT351A	Test and commission electrical equipment	3	90	Trade may apply	UTPNEG129A	Full
UEPMNT352A	Test and commission electronic electrical equipment	3	90	Trade may apply	UTPNEG131A	Full
UEPMNT353A	Install instrumentation equipment	3	90	Trade may apply	UTPNEG243A	Full
UEPMNT354A	Install instrumentation wiring systems	3	90	Trade may apply	UTPNEG244A	Full
UEPMNT355A	Install complex/electronic	3	90	Trade may	UTPNEG245A	Full

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	instrumentation equipment			apply		
UEPMNT356A	Maintain instrumentation equipment	3	90	Trade may apply	UTPNEG246A	Full
UEPMNT357A	Diagnose and repair faults in instrumentation equipment	3	90	Trade may apply	UTPNEG249A	Full
UEPMNT358A	Modify instrumentation equipment	3	90	Trade may apply	UTPNEG252A	Full
UEPMNT359A	Test and Commission Instrumentation Systems	3	90	Trade may apply	UTPNEG255A	Full
UEPMNT360A	Terminate fibre optic cables	3	80	Trade may apply	UTPNEG259A	Full

Schedule 4 Units UEPOPS401A – UEPOPS442A

CODE	UNIT TITLE	Notional AQF Level	WEIGHTING POINTS	Prerequisites Unit	UTP98 UNIT CODE	Equivalent - Full, part or not
UEPOPS401A	Monitor Compliance with Occupational Health and Safety Policy and Procedures	4	120	UEPOPS201A	UTPNEG002A	Full
UEPOPS402A	Conduct Multiple Energy Source Isolation Procedures for Permit to Work	4	130	UEPOPS301A	NEW UNIT	Full
UEPOPS403A	Coordinate Permit to Work System	4	130	UEPOPS402A	UTPNEG005A	Full
UEPOPS404A	Coordinate First Response Team Operation	4	120	UEPOPS201A	UTPNEG008A	Full
UEPOPS405A	Operate and Monitor AC Electrical Systems	4	130	UEPOPS426A	UTPNEG187A	Full

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UEPOPS406A	Operate and Monitor DC Electrical Systems	4	120	UEPOPS426A	UTPNEG188A	Full
UEPOPS407A	Start and Run Up A Gas Turbine	4	120	None	UTPNEG195A	Full
UEPOPS408A	Shut Down a Gas Turbine	4	120	None	UTPNEG197A	Full
UEPOPS409A	Start-Up A Boiler Unit	4	130	None	UTPNEG206A	Full
UEPOPS410A	Shut Down A Boiler Unit	4	120	None	UTPNEG208A	Full
UEPOPS411A	Run Up A Steam Turbine	4	130	None	UTPNEG209A	Full
UEPOPS412A	Undertake Operations Commissioning / Decommissioning	4	130	None	UTPNEG217A	Full
UEPOPS413A	Coordinate Operational Strategies for Power Production	4	120	None	NEW UNIT	Full
UEPOPS414A	Perform Risk Analysis of Generation Plant	4	120	None	UTPNEG221A	Full
UEPOPS415A	Perform Cost Estimations	4	120	None	UTPNEG222A	Full
UEPOPS416A	Monitor the Implementation of the Enterprise’s Production / Maintenance Quality Control procedures	4	120	UEPOPS338A	NEW UNIT	Full
UEPOPS417A	Monitor and Implement Environmental Plans and Procedures	4	120	None	UTPNEG230A	Full
UEPOPS418A	Deliver and Review Training	4	120	None	UTPNEG205A	Full
UEPOPS419A	Reserved			None		Full
UEPOPS420A	Coordinate the Network/System	4	130	None	NEW UNIT	
UEPOPS421A	Manage Critical Incidents	4	130	None	NEW UNIT	
UEPOPS422A	Schedule Generation	4	120	None	UTPNEG273A	Full

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UEPOPS423A	Plan a Scheduled Outage	4	120	None	UTPNEG274A	Full
UEPOPS424A	Coordinate Local H.V. Networks	4	110	None	UTPNEG275A	Full
UEPOPS425A	Produce Maintenance Plans For Generation Production Plant	4	130	None	UTPNEG219A	Full
UEPOPS426A	Interpret and Analyse Multi-Operation Protection Devices	4	120	UEPOPS344A	NEW UNIT	
UEPOPS427A	Interpret and Analyse Low Voltage and Mechanical Protection Devices	4	120	None	NEW UNIT	
UEPOPS428A	Develop H.V. Switching Programs	4	120	None	UTPNEG281A	Full
UEPOPS429A	Coordinate and Direct Switching Program	4	110	None	UTPNEG284A	Full
UEPOPS430A	Control Permit to Work Operations	4	130	None	NEW UNIT	
UEPOPS431A	Collect and Analyse Hydrological and Meteorological Data	4	120	UEPOPS209A	NEW UNIT	
UEPOPS432A	Start up a Heat Recovery Steam Generator Unit	4	130	UEPOPS333A	NEW UNIT	
UEPOPS433A	Operate and Monitor a Heat Recovery Steam Generator Unit	4	120	UEPOPS33A	NEW UNIT	
UEPOPS434A	Shutdown an Heat Recovery Steam Generator Unit	4	130	None	NEW UNIT	
UEPOPS435A	Operate and Monitor Flue Gas NOx Mitigation Systems	4	110	None	NEW UNIT	
UEPOPS436A	Operate and Monitor Dual Fuel Firing Plant	4	120	None	NEW UNIT	
UEPOPS437A	Manage System Re-Start	4	110	None	NEW UNIT	

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UEPOPS438A	Coordinate Electrical Energy Production	4	130	None	UTPNEG212A	Full
UEPOPS439A	Plan and Organise Work	4	110	None	UTPNEG200A	Full
UEPOPS440A	Co-ordinate Team Activities	4	110	None	UTPNEG202A	Full
UEPOPS441A	Operate and Monitor System Equipment	4	110	None	UTPNEG267A	Full
UEPOPS442A	Monitor and Co-ordinate the Operation of a Combined Cycle Gas Turbine Unit	4	110	NEPOPS314A	NEW UNIT	

Schedule 5 Units UEPMNT401A – UEPMNT433A

CODE	UNIT TITLE	Notional AQF Level	WEIGHTING POINTS	Prerequisites Unit	UTP98 UNIT CODE	Equivalent - Full, part or not
UEPMNT401A	Install and Maintain Complex Mechanical Seals	4	120	Trade Cert. needed	UTPNEG060A	Full
UEPMNT402A	Conduct Complex Levelling and Alignment	4	120	Trade Cert. needed	UTPNEG061A	Full
UEPMNT403A	Maintain Complex Mechanical Valves	4	120	UEPMNT303A	UTPNEG063A	Full
UEPMNT404A	Maintain Complex Mechanical Pumps	4	120	UEPMNT304A	UTPNEG065A	Full
UEPMNT405A	Maintain Fluid Power Systems	4	130	UEPMNT301A	UTPNEG068A	Full
UEPMNT406A	Install and Maintain a Steam Turbine	4	130	UEPMNT402A	UTPNEG075A	Full
UEPMNT407A	Install and Maintain a Gas Turbine	4	130	UEPMNT402A	NEW UNIT	
UEPMNT408A	Install Hydro Turbines	4	130	Trade Cert. needed	NEW UNIT	

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UEPMNT409A	Conduct Welding Inspection/Supervision	4	130	Trade Cert. needed	UTPNEG089A	Full
UEPMNT410A	Diagnose and Repair Faults in Electronic Equipment	4	120	Trade Cert. needed	UTPNEG123A	Full
UEPMNT411A	Diagnose and Repair Faults in Complex Electrical Equipment	4	120	Trade Cert. needed	UTPNEG124A	Full
UEPMNT412A	Modify Complex Electrical Equipment	4	120	Trade Cert. needed	UTPNEG127A	Full
UEPMNT413A	Modify Electronic Electrical Equipment	4	120	Trade Cert. needed	UTPNEG128A	Full
UEPMNT414A	Test and Commission Complex Electrical Equipment	4	120	Trade Cert. needed	UTPNEG130A	Full
UEPMNT415A	Diagnose and Repair Faults in Complex Refrigeration / Air Conditioning Equipment	4	120	Trade Cert. needed	UTPNEG135A	Full
UEPMNT416A	Overhaul Electrical Generators	4	130	UEPMNT351A	NEW UNIT	
UEPMNT417A	Inspect Electrical Generators and Diagnose Faults	4	120	Trade Cert. needed	NEW UNIT	
UEPMNT418A	Perform Mechanical and Fabrication Drafting	4	120	Trade Cert. needed	UTPNEG145A	Full
UEPMNT419A	Perform Civil Drafting	4	120	Trade Cert. needed	UTPNEG146A	Full
UEPMNT420A	Perform Electrical/Electronic Drafting	4	120	Trade Cert. needed	UTPNEG147A	Full

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UEPMNT421A	Conduct Technical Inspection of Process Plant and Equipment	4	120	Trade Cert. needed	UTPNEG232A	Full
UEPMNT422A	Conduct Performance Testing on Process Plant and Equipment	4	120	Trade Cert. needed	UTPNEG233A	Full
UEPMNT423A	Conduct/Implement Condition Monitoring	4	120	Trade Cert. needed	UTPNEG234A	Full
UEPMNT424A	Monitor Efficiency of Thermal Steam Cycle Power Plant	4	110	Trade Cert. needed	UTPNEG235A	Full
UEPMNT425A	Maintain Complex Instrumentation Equipment	4	120	Trade Cert. needed	UTPNEG247A	Full
UEPMNT426A	Maintain Electronic Instrumentation Equipment	4	120	Trade Cert. needed	UTPNEG248A	Full
UEPMNT427A	Diagnose and Repair Faults in Complex Instrumentation Equipment	4	120	Trade Cert. needed	UTPNEG250A	Full
UEPMNT428A	Modify Complex Instrumentation Equipment	4	120	Trade Cert. needed	UTPNEG253A	Full
UEPMNT429A	Modify Electronic Instrumentation Equipment	4	120	Trade Cert. needed	UTPNEG254A	Full
UEPMNT430A	Test and Commission Complex Instrumentation Equipment	4	120	Trade Cert. needed	UTPNEG256A	Full
UEPMNT431A	Test and Commission Electronic Instrumentation Equipment	4	120	Trade Cert. needed	UTPNEG257A	Full
UEPMNT432A	Write Programs for Control Systems	4	120	Trade Cert. needed	UTPNEG260A	Full

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UEPMNT433A	Conduct Routine Generation Electrical Maintenance	4	120	Trade Cert. needed	UTPNEG137A	Full

Schedule 6 Units UEPOPS501 – UEPOPS515

CODE	UNIT TITLE	Notional AQF Level	WEIGHTING POINTS	Prerequisites Unit	UTP98 UNIT CODE	Equivalent - Full, part or not
UEPOPS501A	Manage Occupational Health and Safety Policy and Procedures	5	160	UEPOPS401A	UTPNEG003A	Full
UEPOPS502A	Manage Permit to Work System	5	160	UEPOPS403A	NEW UNIT	
UEPOPS503A	Manage first response team operations	5	160	UEPOPS404A	NEW UNIT	
UEPOPS504A	Develop Implement and Monitor Environmental Management Systems	5	160	None	UTPNEG009A	Full
UEPOPS505A	Produce maintenance strategies for generation production plant	5	150	UEPOPS425A	UTPNEG218A	Full
UEPOPS506A	Establish and Implement Operational Strategies for Power Production	5	150	None	UTPNEG220A	Full
UEPOPS507A	Conduct project management	5	150	None	UTPNEG223A	Full
UEPOPS508A	Manage commissioning/ decommissioning	5	150	None	UTPNEG224A	Full
UEPOPS509A	Manage quality control procedures	5	150	None	UTPNEG225A	Full
UEPOPS510A	Monitor power generation plant reliability	5	140	None	UTPNEG236A	Full

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UEPOPS511A	Tune Process Plant and Equipment	5	150	None	UTPNEG237A	Full
UEPOPS512A	Manage the Network/System	5	160	UEPOPS420A	UTPNEG271A	Full
UEPOPS513A	Manage Operational Crisis to Maintain/Restore Power System Integrity	5	140	None	UTPNEG279A	Full
UEPOPS514A	Control hydro generation/pumping	5	140	None	UTPNEG280A	Full
UEPOPS515A	Coordinate power generation	5	150	None	UTPNEG285A	Full

Schedule 7 Units UEPMNT501 – UEPMNT504

CODE	UNIT TITLE	Notional AQF Level	WEIGHTING POINTS	Prerequisites Unit	UTP98 UNIT CODE	Equivalent - Full, part or not
UEPMNT501A	Diagnose and Repair Faults in Electrical and Electronic Systems	5	160	Trade Cert. needed	UTPNEG125A	Full
UEPMNT502A	Test and Commission Electronic Electrical Systems	5	160	Trade Cert. needed	UTPNEG132A	Full
UEPMNT503A	Diagnose and Repair Faults in Instrumentation Systems	5	160	Trade Cert. needed	UTPNEG251A	Full
UEPMNT504A	Test and Commission Instrumentation Systems	5	160	Trade Cert. needed	UTPNEG258A	Full

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1.3.00 Assessment Guidelines

Volume 1 Part 3

Assessment Guidelines

1.3.01 Assessment Guidelines - Introduction

1.3.1 Assessment Guidelines – Introduction

These Assessment Guidelines provide the endorsed framework for assessment of the competency standard units in this Training Package. They are designed to ensure that assessment activities are consistent with the Australian Quality Training Framework (AQTF) and VET Quality Framework (Standards and Requirements)" Standards for Registered Training Organisations (RTOs). Assessments against the competency standard units in this Training Package must be carried out in accordance with these endorsed Assessment Guidelines.

Note:

1. Using this guideline to support any assessment strategy or process does not remove the responsibility of employers and employees to ensure appropriate ‘duty of care’ arrangements are maintained under relevant occupational health and safety legislation, and any other prevailing legislation, regulation, standard or code. RTOs should recognise this in their assessment processes and provide requisite advice.
2. In the assessment process it should be acknowledged that State/Territory regulatory requirements and/or Codes of Practice may vary. Therefore there may be a requirement for the demonstration of a greater range of items to those specified in respective competency standard units. RTOs should incorporate this in their assessment processes and practices.

1.3.02 Assessment System Overview

1.3.2 Assessment System Overview

This section provides an overview of the requirements for assessment when using this Training Package, including a summary of the AQTF and VET Quality Framework (Standards and Requirements)" requirements; licensing/registration requirements; and assessment pathways.

Quality assessment underpins the credibility of the vocational education and training sector. The Assessment Guidelines of a Training Package are an important tool in supporting quality assessment.

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Assessment within the National Skills Framework is the process of collecting evidence and making judgements about whether competency has been achieved to confirm whether an individual can perform to the standards expected in the workplace, as expressed in the relevant endorsed unit of competency.

Assessment must be carried out in accordance with the:

- benchmarks for assessment
- specific industry requirements
- principles of assessment
- rules of evidence
- assessment requirements set out in the AQTF and VET Quality Framework (Standards and Requirements)"

By way of supporting, and reinforcing, both the concept of competency and the competency standard unit, the Electricity Supply Industry – Generation Sector Industry embraces the following tenets:

- Wherever practicable, summative (or final) assessment is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with any approved industry and Regulatory policy in this regard.
- All persons may claim formal recognition for an assessment of an individual competency standard unit or a group of units (skill clusters).
- All persons have the right to have relevant competencies recognised through the most expeditious assessment system and method.

Benchmarks for Assessment

The purpose of assessment is to confirm through evidence whether an individual can perform to the standards expected in the Electricity Supply Industry – Generation Sector workplace, as expressed in the relevant endorsed competency standard unit.

The Competency Standard Units in this Training Package are the benchmarks for assessment in the Electricity Supply Industry – Generation Sector. They are the basis for nationally recognised Australian Qualifications Framework (AQF) qualifications and Statements of Attainment issued by Registered Training Organisations (RTOs).

The Competency Standard Units in this Training Package include:

- National Electricity Supply Industry – Generation Sector (UEP) Competency Standards, Version 1, 2012 and subsequent endorsed revisions.
- Imported competency standard units from other endorsed Training Packages that have been valued by the National Electricity Supply Industry – Generation Sector Training Advisory Group for inclusion in Qualifications in this Training Package.

An index of the developed Competency Standard Units is contained in Part 1.2.00.

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Australian Quality Training Framework Assessment Requirements

Assessment leading to nationally recognised AQF qualifications and Statements of Attainment in the vocational education and training sector must meet the requirements of the AQTF as expressed in the AQTF 2010 Essential Standards for Registration and VET Quality Framework (Standards and Requirements)".

The AQTF 2010 Essential Standards for Initial and Continuing Registration and VET Quality Framework (Standards and Requirements)" can be downloaded from <www.training.gov.au>.

The following points summarise the assessment requirements.

Registration of Training Organisations

Assessment must be conducted by, or on behalf of, an RTO formally registered by a State or Territory Registering/Course Accrediting Body in accordance with the Standards for Registered Training Organisations. The RTO must have the specific competency standard units and/or AQF qualifications on its scope of registration. The RTO is to be responsible for all aspects of assessment. The assessment must cover the critical aspects of evidence (assessment) detailed in each Competency Standard Unit. In addressing these critical aspects, and ensuring reasonable consistency, the assessment is to ensure that:

- the individual satisfies the requirements in terms of underpinning/essential knowledge and associated skills so that their ability to transfer the competency to differing circumstances may reasonably be inferred
- the individual is competent to safely perform all the practical applications required.

The RTO is also responsible for the issue of formal recognition in the form of National Qualifications or Statements of Attainment and where regulatory requirements apply provide additional information so required, and enter, where applicable and preferred by industry relevant information into an individual Industry Skills Passport, or other industry approved instrument. The RTO will therefore:

- issue the National Qualification based on individuals having been assessed as competent for the qualification and all the competency standard units which constitute the qualification. (See Part 1 of this Training Package), and/or
- issue formal recognition (Statements of Attainment) in respect of individual or clusters of competency standard units for which candidates have been assessed and found competent, and/or
- where required for regulated or industry purposes, issue additional formal information as specified by the industry and relevant regulator.

Quality Training and Assessment

Each RTO must provide quality training and assessment across all its operations. See the AQTF 2010 and VET Quality Framework (Standards and Requirements)" Essential Standards for Initial and Continuing Registration, Standard 1.

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Assessor Competency Requirements

Each person involved in training and assessment must be competent for the functions they perform. See the AQTF 2010 and VET Quality Framework (Standards and Requirements)" Essential Standards for Initial and Continuing Registration, Standard 1 for assessor (and trainer) competency requirements. See also the AQTF 2010 Users' Guide to the Essential Standards for Registration – Appendix 2.

Assessment Requirements

The RTOs assessments, including RPL, must meet the requirements of the relevant endorsed Training Package. See the AQTF 2010 and VET Quality Framework (Standards and Requirements)" Essential Standards for Initial and Continuing Registration.

Assessment Strategies

Each RTO must have strategies for training and assessment that meet the requirements of the relevant Training Package or accredited course and are developed in consultation with industry stakeholders. See the AQTF 2010 and VET Quality Framework (Standards and Requirements)" Essential Standards for Initial and Continuing Registration.

National Recognition

Each RTO must recognise the AQF qualifications and Statements of Attainment issued by any other RTO. See the AQTF 2010 and VET Quality Framework (Standards and Requirements)" Essential Standards for Initial and Continuing Registration.

Access and Equity and Client Services

Each RTO must adhere to the principles of access and equity and maximise outcomes for its clients. See the AQTF 2010 and VET Quality Framework (Standards and Requirements)" Essential Standards for Initial and Continuing Registration.

Monitoring Assessments

Training and/or assessment provided on behalf of the RTO must be monitored to ensure that it is in accordance with all aspects of the AQTF 2010 and VET Quality Framework (Standards and Requirements)" Essential Standards for Initial and Continuing Registration.

Recording Assessment Outcomes

Each RTO must manage records to ensure their accuracy and integrity. See the AQTF 2010 and VET Quality Framework (Standards and Requirements)" Essential Standards for Initial and Continuing Registration.

Issuing AQF qualifications and Statement of Attainment

Each RTO must issue AQF qualifications and Statements of Attainment that meet the requirements of the current AQF Implementation Handbook and the endorsed Training Packages within the scope of its registration. An AQF qualification is issued once the full requirements for a qualification, as specified in the nationally endorsed Training Package are met. A Statement of Attainment is issued when an individual has completed one or more units of competency from nationally recognised qualification(s)/courses(s). See the AQTF, VET Quality Framework (Standards and Requirements)" and the edition of the AQF Implementation Handbook—available on the AQF Council website www.aqf.edu.au.

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Licensing/Registration Requirements

Licensing and registration requirements that apply to specific industries, and vocational education and training, vary between each State and Territory, and can regularly change. The developers of this Training Package consider that the licensing/registration requirements described in this section apply to RTOs, assessors or candidates with respect to this Training Package. While reasonable care has been taken in its preparation, the developers of this Training Package and the Department cannot guarantee that the list is definitive or accurate at the time of reading; the information in this section is provided in good faith on that basis.

Contact the relevant State or Territory Department(s) to check if the licensing/registration requirements described below still apply, and to check if there are any others with which you must comply. For further information contact:

Jurisdiction	Organisation	Website	Telephone number
Australian Capital Territory	ACT Planning and Land Authority	www.actpla.act.gov.au	02 6207 1923
New South Wales	Office of Fair Trading	www.fairtrading.nsw.gov.au	133 220
Northern Territory	NT WorkSafe	www.worksafe.nt.gov.au	1800 019 115
Queensland	Department of Mines and Energy	www.dme.qld.gov.au	07 3898 0375
South Australia	Office of Consumer and Business Affairs	www.ocba.sa.gov.au	08 8204 9696
Tasmania	WorkCover Tasmania	www.workcover.tas.gov.au	03 6233 7851
Victoria	Energy Safe Victoria	www.esv.vic.gov.au	03 9203 9700
Western Australia	Department of Consumer and Employment Protection - Energy Safety	www.energysafety.wa.gov.au	08 9422 5282

Licensing and/or registration requirements relevant to training, assessment and performance in the workplace of competencies in the Generation Industry Training Package are documented in the relevant units of competency at: 1.2) License to practice.

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Licensing Line News

Licensing Line News is a Department of Education, Employment and Workplace Relations funded communication initiative to support the Council of Australian Governments (COAG) occupational licensing reform agenda. This website provides updated information on licensing and regulatory requirements. See: http://www.licensinglinenews.com/

Mutual Recognition

Registered Training Organisations may contact EE-Oz Training Standards as the declared National Industry Skills Council for the ElectroComms and EnergyUtilities Industry, for assistance regarding mutual recognition.

Partnership Arrangements

RTOs must have, and comply with, written agreements with each organisation providing training and/or assessment on its behalf. See AQTF Standard 1.6 of the Standards for Registered Training Organisations.

RTOs operating in partnership with other organisations are responsible for the quality of the partnering organisation services and service outcomes. Under the AQTF and VET Quality Framework (Standards and Requirements)", RTOs may through written agreement enter into partnerships with external and/or non-registered third party organisations, such as schools, industry organisations and enterprises, for delivery and assessment within the RTOs scope of registration.

External and/or non-registered third party organisations need not be Registered Training Organisations (RTOs). However, the agreement must specify how each party to the agreement will discharge its responsibilities for compliance with all aspects of the Standards for Registered Training Organisations.

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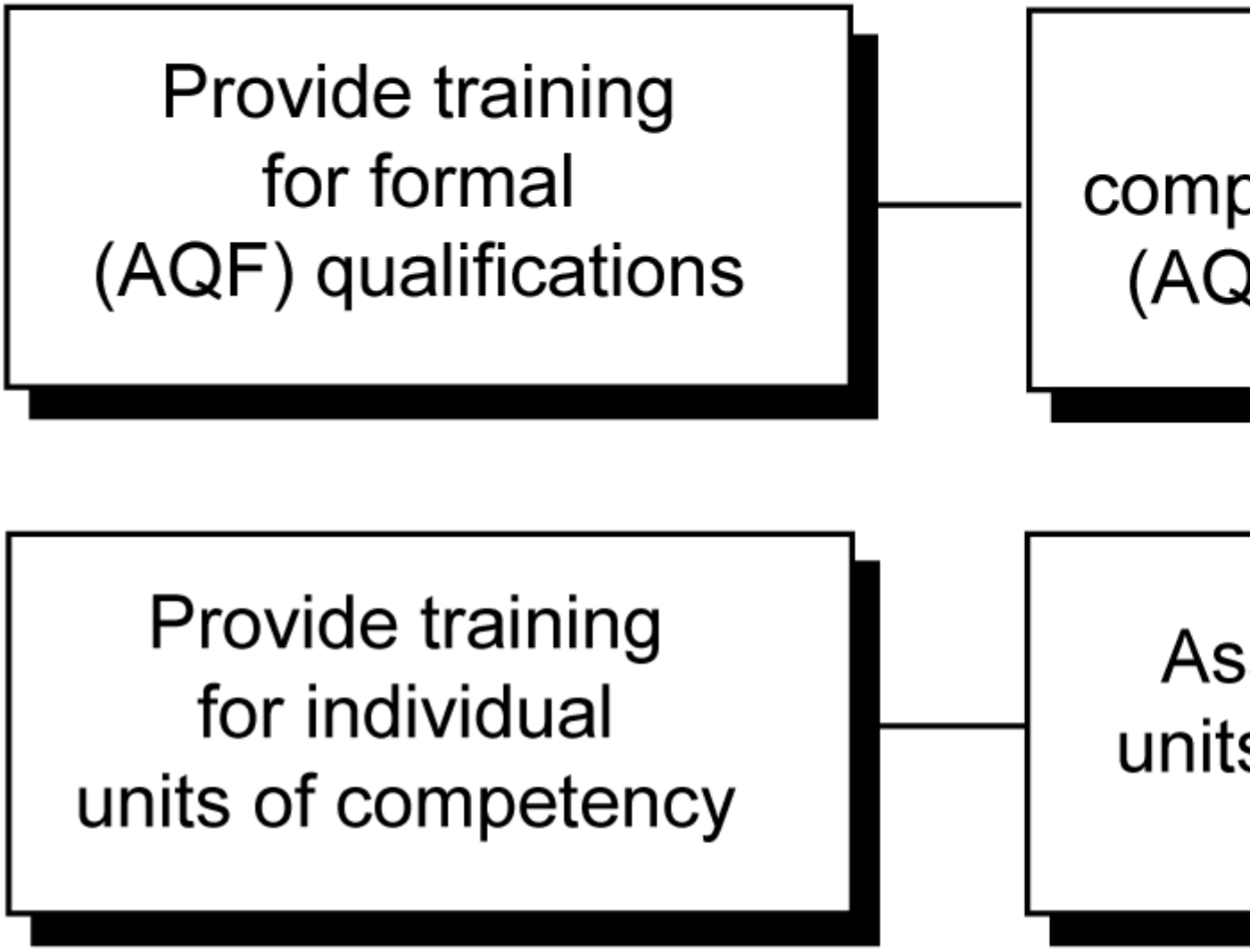
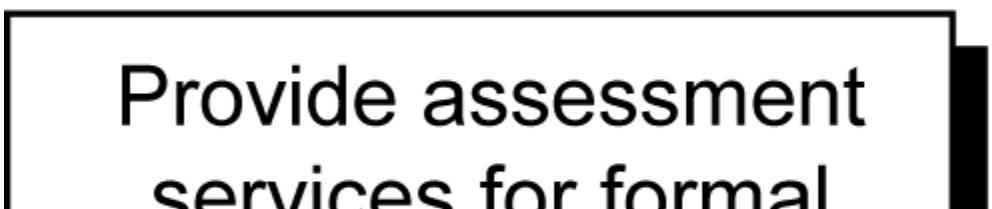
Possible roles f

Training and assessment:



Assessment only:



Where the RTO establishes a partnership arrangement it must have a formal agreement with the organisation that provides the training and/or assessment services. The agreement must specify how all parties will discharge their responsibilities for ensuring the quality of the training and/or assessment conducted on its behalf, including the qualification requirements of those to be involved in delivery and assessment.

The RTO has full responsibility for the quality and outcomes of any training or assessment conducted on its behalf, and must maintain a register of all such agreements.

Recording Assessment Outcomes

Each RTO must have effective administration and records management procedures in place, and must record AQF qualifications and Statements of Attainment issued. See AQTF Standards 4 and 10.2 of the Standards for Registered Training Organisations.

Statements of Attainment and qualifications issued under the AQF must comply with the relevant provisions in the current Australian Qualifications Framework Implementation Handbook and any other guides issued by the respective State Training Authorities, as well as any regulated requirements and those preferred by industry and advised within this Training Package.

Licensing/Registration Arrangements

It is a requirement that Training Package developers consider licensing/registration requirements in the development of the respective Industry Training Package. Generally licensing/registration requirements will be incorporated in relevant competency standard units/qualifications.

Where licensing/registration applies, RTOs are to ensure that assessment against relevant Competency Standard Units is consistent with regulated requirements. Evidence of achievement should be gathered and recorded in such a way as to allow RTOs to report on such achievement that is consistent with regulated requirements.

RTOs are responsible for the implementation of the quality assurance arrangements included in these guidelines. However, where competency development occurs in regulated/licensed areas, RTOs are to incorporate into their quality assurance arrangements, any additional, prevailing regulatory authority requirements. In some instances, in order to conduct assessments for statutory licensing or other industry registration requirements, assessors must also meet any additional requirements established by the regulatory body/agency. Respective regulators should be contacted directly to obtain information in this regard.

Requirements for Assessors

In order to conduct assessment for statutory licensing or other industry registration requirements assessors must meet the requirements established by regulatory agencies and respective nominees, in addition to the AQTF and VET Quality Framework (Standards and Requirements)" requirements. Assessors are to liaise with respective agencies to ensure respective requirements are followed and met.

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Requirements for RTOs

Selected competency standard units and qualifications in this Training Package provide the basis for a range of statutory licensing and industry registration arrangements. To satisfy these licensing and registration arrangements, RTOs are to keep abreast of developments and any additional requirements detailed by such bodies and their respective nominees. RTOs and their assessors are therefore required to liaise with the Training Package developer and respective agencies to ensure requirements are known and met.

Requirements for Candidates

Individuals being assessed under statutory licensing and industry registration systems may be required to comply with training and experience requirements additional to any minimum requirements identified in this Training Package. These additional requirements are to be formally communicated by the RTOs to individuals prior to the delivery of the Training Package outcomes.

1.3.03 Learning and Assessment Pathways

1.3.3 Learning and Assessment pathways

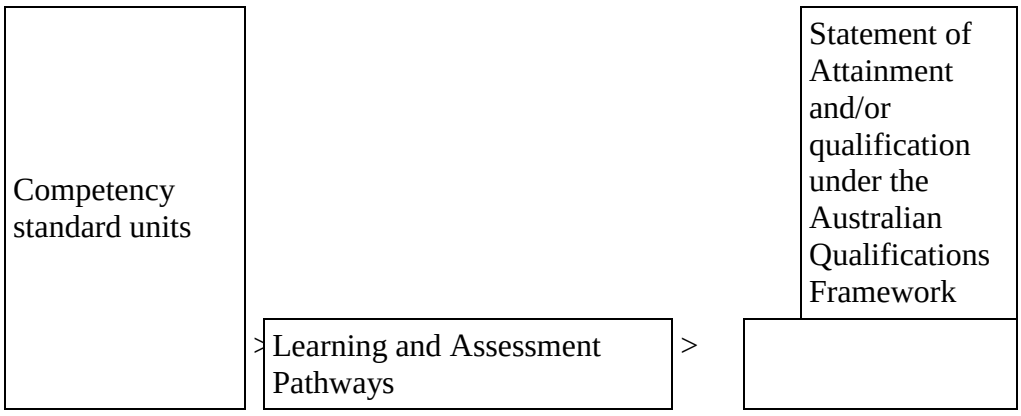
Pathways

Competencies in Training Packages may be attained in a number of ways including:

- education and training
- experiences in the workplace
- general life experience
- any combination of the above.

Assessment under Training Packages leading to an AQF qualification or Statement of Attainment may follow:

- a learning and assessment pathway
- an assessment-only or recognition pathway
- a combination of the two.



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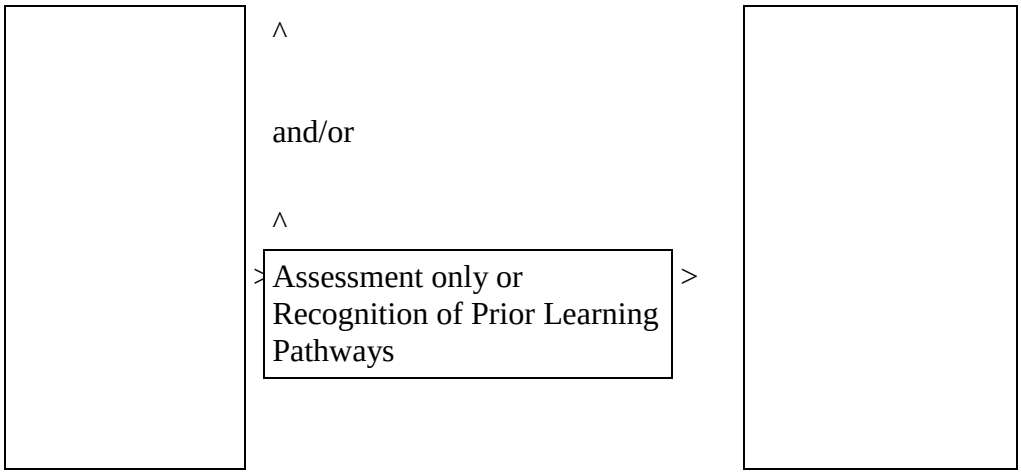

Each of these assessment pathways leads to full recognition of competencies held – the critical issue is that the candidate is competent, not how the competency was acquired.

Assessment, by any pathway, must comply with the assessment requirements set out in the Standards for Registered Training Organisations.

Learning and Assessment Pathway Integration

New Entrants

Learning and assessment for new entrants is integrated and in part structured, with assessment evidence being collected progressively and feedback being provided to the candidate any time throughout the competency development learning and assessment process. Learning and assessment pathways may include structured programs in a variety of contexts using a range of strategies to meet different learner needs. Structured learning and assessment programs could be group-based, work-based, project-based, self paced, action learning-based; conducted by distance or e-learning; and involve practice and experience in the workplace.

Learning and assessment pathways that suit New Apprenticeships are a mix of formal training and workplace experience. They may be structured but need to take into account:

- typical irregular work activity
- work availability as it affects access to the range of activities required to be covered
- structured formative assessment activities through which candidates can acquire and demonstrate the practical skills and knowledge identified in the relevant competency standards.

The model that best accommodates a learner who has had no prior experiences (new entrant) in the industry is one that recognises that learning occurs and is facilitated best in directed workplace learning activities followed by recurring practice of these activities in a structured educational program. That is, the model is based on a combination of on-the-job and off-the-job learning experiences aligned to competency standard unit requirements. It recognises that learning occurs in an active way and should involve appropriate learning strategies. The model provides coherence and integration between respective components. It also represents:

- a most effective and efficient means of effecting quality education and training
- a means of assessing if learning has occurred and competence has been attained.

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Competency standard units are specifications of work performance which do not provide specific information about the provision of training or detail as to how assessment activities are to be carried out. Given the nature of the information (content and its interrelationship) contained within the competency standard units there is the potential for a variety of interpretations to occur when RTOs are designing training programs.

To improve opportunities for consistency in interpretation, the industry's preferred approach is to support the use of appropriate learning and assessment strategies. To this end it has developed a Guideline Training and Assessment Model detailing the preferred approach. A copy of the model is available from EE-Oz Training Standards.

Assessment-Only Pathway or Recognition of Prior Learning Pathway

Competencies already held by individuals can be formally assessed against the competency standard units in this Training Package and should be recognised regardless of how, when or where they were achieved.

In some circumstances an assessment only (skills recognition) pathway will be warranted. The candidate provides current, quality evidence against the relevant Competency Standard Unit(S), and the outcomes of the assessment process indicate that the candidate is competent and that structured training is not required.

Candidates wishing to take this pathway present evidence that they possess the skills and knowledge identified in the relevant competency standard unit(s). The assessor then judges whether the candidate is competent. Summative approaches to assessment may be directed by the candidate (such as in the compilation of portfolios), or by the assessor (such as observation of workplace performance, requiring demonstrations of skills, and completion of oral and written testing).

As with all assessment, the assessor must be confident that the evidence indicates that the candidate is currently competent against the endorsed competency standard unit. This evidence may take a variety of forms and might include certification, Industry Skills Council equivalence mapping declarations, references from past employers, testimonials from clients and work samples. The onus is on candidates to provide sufficient evidence to satisfy assessors that they currently hold the relevant competencies. In judging evidence, the assessor must ensure that the evidence is:

- authentic (the candidate's own work)
- valid (directly related to the current version of the relevant endorsed competency standard unit)
- reliable (a range of test instruments will provide the same result for a given candidate)
- current (reflect the candidate's current capacity to perform the aspect of the work covered by the endorsed Competency Standard Unit)
- sufficient (covers the full range of Elements and Performance Criteria in the relevant competency standard unit and addresses the four dimensions of competency, namely task skills, task management skills, con tangency management skills, and job/role environment skills).

Assessment-only or recognition of prior learning pathways are likely to be most appropriate in the following scenarios:

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- candidates participating/enrolling in qualifications who want recognition for prior learning or current competencies
- existing workers
- individuals with overseas qualifications
- recent migrants with established work histories
- people returning to the workplace
- people with disabilities or injuries requiring a change in career
- people with existing competencies from allied industry Training Packages.

Note: The pathways listed above are only suggestions and should not be used to limit a greater range of candidates seeking assessment.

Combination of 'Training and Assessment' and 'Assessment-Only' Pathways

Where candidates have gained competencies through work and life experience and gaps in their competence are identified, or where they require training in new areas, a combination of approaches may be appropriate. In such situations, the candidate may undertake an initial assessment to determine their current competence using an 'assessment only pathway'. Once current competence is identified, a structured training and assessment program may be established to ensure that the candidate acquires the required additional competencies or gap. These would be achieved through a 'training and assessment pathway'.

Learning and Assessment Pathways in the Electricity Supply Industry – Generation Sector

Within the general Training Package Pathways continuum framework, referred to above, three distinct Assessment Pathways have been identified for use within the National Electricity Supply Industry – Generation Sector.

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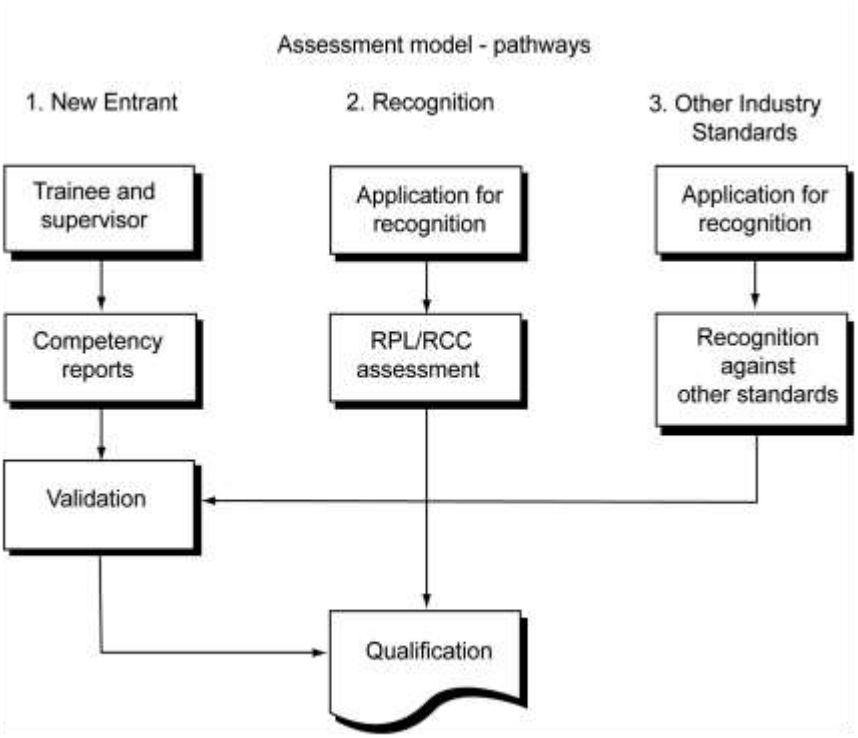
Pathway 1: New entrant competency development

Pathway 2: Recognition of currently held competencies or prior learning and workplace experience

Pathway 3: Recognition of other currently held competencies (other industry standards)



Although not exclusive, the three pathways provide typical recognition processes for individual Competency Standard Units or groups of units that make up Qualifications or Statements of Attainment. From an industry perspective, assessment is to lead to formal recognition of the Industry's benchmark competencies or formal recognition of competencies from other industries. Formal recognition may be for individual competencies or for groups of competencies, which may also be combined to satisfy the requirements of a National Qualification.

Pathway 1: New Entrant Competency Development

This pathway is for individuals who are undertaking an industry-preferred competency development plan. The users of this pathway may be:

- contracted employment based employees who are generally new apprentices and who undertake an approved training program that supports a competency development plan, or
- those that undertake an approved structured training program in an institutional environment to achieve competency outcomes.

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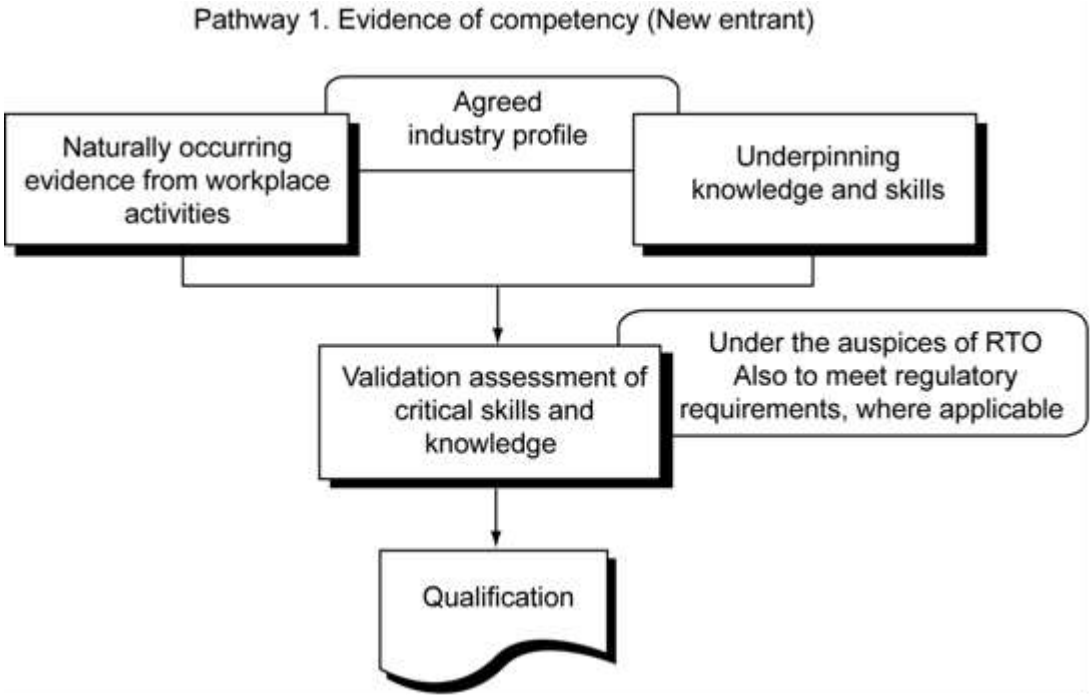
Evidence of Competency

In this pathway evidence required to determine competence for the issuance of the qualification or Statement of Attainment is to be in accordance with 3.5 Assessment within the National Electricity Supply Industry – Generation Sector contained herein. The evidence however, must be sufficient in quality, quantity and type and be gathered in an on-going way and in a timely and accurate manner from several sources, such as workplace and educational experiences based on the approved industry training program and related competency development plan in which individuals are involved.



Pathway 2: Recognition of Prior Learning/Current Competencies (RPL/RCC)

This pathway is for those who may have acquired skills and knowledge in relevant competency standard units outside formally recognised processes. The users of this pathway will include applicants from overseas and also applicants who have developed skills in allied industries but who have no formal recognition in respect of industry standards or qualifications. In using this pathway RTOs should also identify if any equivalence mapping document exists as per Pathway 3.

Additionally, an existing national mechanism for the recognition as a tradesperson exists through the Tradesmen's' Rights Regulation Act, which is administered by Trades Recognition Australia (TRA), part of the Commonwealth Department of Industrial Relations. TRA grants recognition for the purposes of migration but further analysis of the applicant's knowledge and skills is often needed before competency can be attributed.

The Trades Recognition Australia process mainly operates to provide formal recognition of the knowledge and skills migrants have developed through structured training and/or work experience in overseas countries. It is also an important mechanism for the assessment and recognition of the competencies of people who may not have had access to the industry-preferred new entrant model of competency development for trade vocations in Australia. For more information visit:

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http://www.workplace.gov.au/workplace/Category/SchemesInitiatives/TRA/TRA-TradeClassificationsAssessed.htm

Evidence of Competency

In this pathway many types of evidence can be used to determine competency for the issuance of Qualifications or Statements of Attainment. The evidence may come from records of previous relevant work experience. This type of evidence will need endorsement by a supervisor/mentor skilled in the units for which recognition is sought. Evidence may consist of portfolios, which include projects or products completed for other purposes or from non-registered training programs or ad hoc prior experience or from overseas programs of a similar nature.

Industry would expect this evidence to be assessed by the Registered Organisation (or their nominee – a qualified industry assessor) and a judgement made. The result will be either that the applicant is judged competent for the competency standard unit(s) or gaps are identified and noted.

Where a gap is identified, the applicant can either accept the judgement and pursue gap training or elect to appeal the decision. Evidence used in the judgement process may come from a variety of sources including a personal portfolio, curriculum vitae, interview, and comments by peers or employers and challenge tests.

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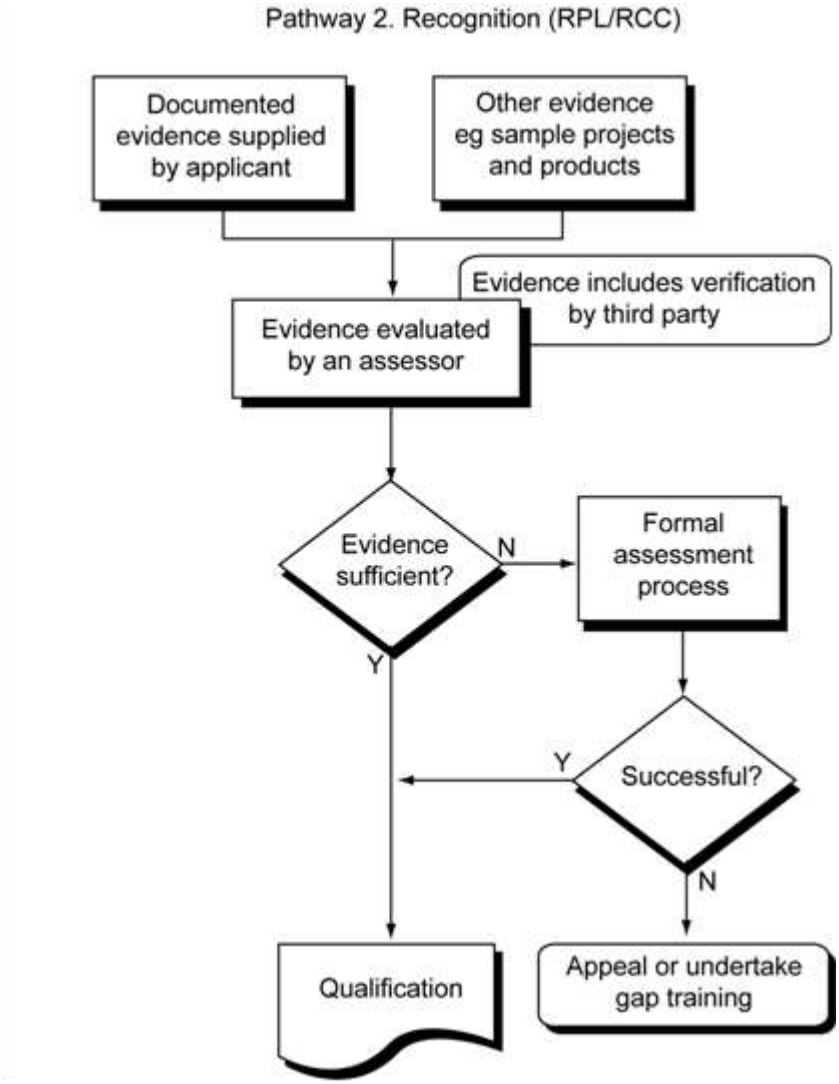
The recognition of a subset of the competency standard units — skills, forming a cluster of Statements of Attainment within a Qualification — would generally require individuals to complete the additional units in order to attain the relevant Qualification Pathway that provides credit. This information may be developed by the Registered Training Organisation in consultation with respective stakeholders.



Pathway 3: Recognition of Other Industry/Enterprise Standards

This pathway is for individuals who have developed skills based on other nationally recognised industry or enterprise competency standards and who have received formal recognition in Competency Standards Unit(S) from these areas. Recognition of equivalence of competency standard units between industries is through an agreed and formal mapping process. Equivalence of outcomes is declared by Industry Skills Councils for respective Training Packages. The recognition of Units, as part of any mapping arrangements is the responsibility of the parties who maintain the competency standards; in this instance EE-Oz Training Standards. RTOs should investigate whether there are any existing mapping agreements by contacting the relevant Industry Skills Councils.

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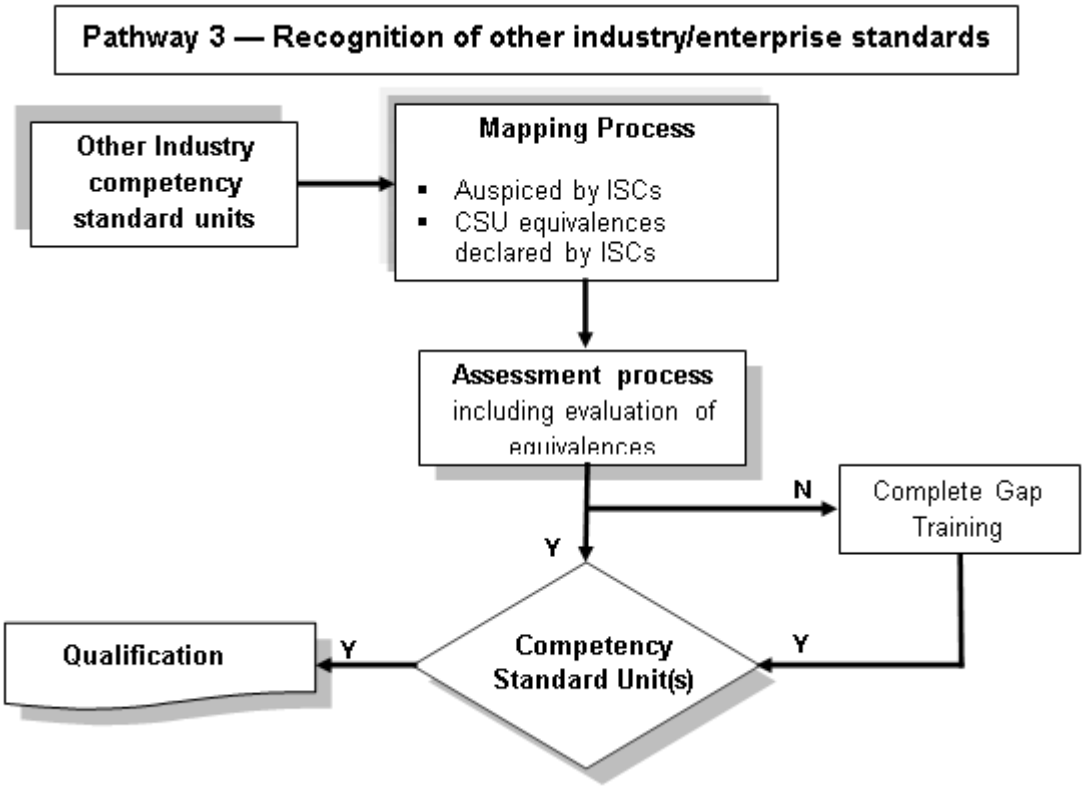
Evidence of Competency

In this pathway, evidence will be based on formally-agreed mapping declaration(s) of competency standards unit(s) from other Industry Competency Standards against the unit(s) in the National Electricity Supply Industry – Generation Sector Training Package for which formal recognition is sought. The equivalence mapping declaration agreement would be formalised between Industry Skills Councils.

The applicant would be required to supply details of the unit(s) held including any currency, and the unit(s) sought in consultation with the RTO, including submitting any assessment reports to the RTO for a determination. This equivalence evidence will be reviewed against the mapping advice obtained by the RTO (or their nominee) and a judgement made. The result will be either that the applicant is deemed competent for the unit(s) and a Statement of Attainment issued, or gaps are identified and noted. Where a gap has been identified the applicant can consider the judgement, pursue gap training or appeal the decision. Evidence used in the judgement process is based on the individual's records of achievement relative to the competency standard units for which recognition is sought.



1.3.04 Assessment Principles - ESI - Generation Sector

1.3.4 Assessment Principles – Electricity Supply Industry – Generation Sector

All assessments carried out by RTOs are required to demonstrate compliance with the principles of assessment:

- validity

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- reliability
- flexibility
- fairness
- sufficiency

These principles must be addressed in the:

- design, establishment and management of the assessment system for this Training Package
- development of assessment tools, and
- the conduct of assessment

Assessment Principles

Validity

Assessment is valid when the process is sound and assesses what it claims to assess.

Validity requires that:

a) (a) assessment against the units of competency must cover the broad range of skills and knowledge that are essential to competent performance

b) (b) assessment of knowledge and skills must be integrated with their practical application

c) (c) judgement of competence must be based on sufficient evidence (that is, evidence gathered on a number of occasions and in a range of contexts using different assessment methods). The specific evidence requirements of each unit of competency provide advice on sufficiency

The assessment instruments and tasks must be designed, implemented and administered in a manner which ensures they measure the intended Essential Knowledge and Associated Skills with workplace performance requirement, and the evidence gathered relates directly to the competency standard unit(s) being assessed.

Validity includes the need to involve others with expertise in the assessments being implemented in the development, selection and review of the instruments and methods used in the assessment process.

To be valid the assessment judgements need to be based on more than one task with evidence gathered on a number of occasions and in a variety of contexts or situations.

Reliability

Reliability refers to the degree to which evidence presented for assessment is consistently interpreted and results in consistent assessment outcomes. Reliability requires the assessor to have the required competencies in assessment and relevant vocational competencies (or to assess in conjunction with someone who has the vocational competencies). It can only be achieved when assessors share a common interpretation of the assessment requirements of the unit(s) being assessed.

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RTOs will ensure clear guidelines are available to assessors to ensure consistent judgements are made based on the evidence provided. Where industry and/or regulatory-endorsed training support materials are available, it is recommended that this material is used to support and increase the reliability of assessment. This approach will assist in establishing and maintaining consistency of performance of the essential knowledge and skills and work performance requirements specified in the competency standard units.

Flexibility

To be flexible, assessment should reflect the candidate's needs; provide for recognition of competencies no matter how, where or when they have been acquired; draw on a range of methods appropriate to the context, competency and the candidate; and support continuous competency development.

The assessment approach should be developed to meet the needs of potential candidates and where appropriate negotiated between the candidate and assessor.

Assessments are to cover both the skill and knowledge components of competency as described in the competency standard units without any one-assessment method being prescribed.

A range of assessment instruments and items should be made available and, where appropriate, the time and place of assessment should be determined to suit the availability of resources, assessors and candidates. However, where supported by the Industry for the purposes of enhancing consistency, the preferred assessment arrangements should be adopted and used.

Fairness

Fairness in assessment requires consideration of the individual candidate's needs and characteristics, and any reasonable adjustments that need to be applied to take account of them. It requires clear communication between the assessor and the candidate to ensure that the candidate is fully informed about, understands and is able to participate in, the assessment process, and agrees that the process is appropriate. It also includes an opportunity for the person being assessed to challenge the result of the assessment and to be reassessed if necessary.

Assessment methods and practices shall be equitable to all individuals.

Candidates will be made aware of the assessment methods and procedures together with details of the criteria against which they are to be assessed.

Specific needs of individual candidates will be accommodated as is practicable and reasonable adjustment is made while maintaining the integrity of the assessment outcomes based on the competency standard unit(s) being assessed.

Sufficiency

Sufficiency relates to the quality and quantity of evidence assessed. It requires collection of enough appropriate evidence to ensure that all aspects of competency have been satisfied and that competency can be demonstrated repeatedly. Supplementary sources of evidence may be necessary. The specific evidence requirements of each unit of competency provide advice on sufficiency. Sufficiency is also one of the rules of evidence.

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In all instances competency is to be attributed on evidence sufficient to show that a person has the necessary skills required for the scope of work. This includes:

Task skills — performing individual tasks

Task management skills — managing a number of different tasks

Contingency management skills — responding to irregularities and breakdowns in routines, and

- Job/role environment skills — dealing with the responsibilities and expectations of the work environment including working with others.

Evidence must demonstrate that an individual can perform competently across the specified range of activities and has the essential knowledge, understanding and associated skills underpinning competency.

Currency

The principle to be applied in the Electricity Supply Industry – Generation Sector for currency of evidence is that claims are to be fully substantiated through both direct and supporting assessment processes.

Assessment processes must satisfy the requirement for currency in terms of:

1. technology and/or processes
2. recency of application

Rules of Evidence

The rules of evidence guide the collection of evidence that address the principles of validity and reliability, guiding the collection of evidence to ensure that it is valid, sufficient, current and authentic.

Valid

Valid evidence must relate directly to the requirements of the unit of competency. In ensuring evidence is valid, assessors must ensure that the evidence collected supports demonstration of the outcomes and performance requirements of the unit of competency together with the knowledge and skills necessary for competent performance. Valid evidence must encapsulate the breadth and depth of the unit of competency, which will necessitate using a number of different assessment methods.

Sufficient

Sufficiency relates to the quality and quantity of evidence assessed. It requires collection of enough appropriate evidence to ensure that all aspects of competency have been satisfied and that competency can be demonstrated repeatedly. Supplementary sources of evidence may be necessary. The specific evidence requirements of each unit of competency provide advice on sufficiency.

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Current

In assessment, currency relates to the age of the evidence presented by a candidate to demonstrate that they are still competent. Competency requires demonstration of current performance, so the evidence collected must be from either the present or the very recent past.

Authentic

To accept evidence as authentic, an assessor must be assured that the evidence presented for assessment is the candidate's own work.

Sufficiency of Evidence

In all instances competency is to be attributed on evidence sufficient to show that a person has the necessary skills required for the scope of work. This includes:

Task skills — performing individual tasks

Task management skills — managing a number of different tasks

Contingency management skills — responding to irregularities and breakdowns in routines, and

- Job/role environment skills — dealing with the responsibilities and expectations of the work environment including working with others.

Evidence must demonstrate that an individual can perform competently across the specified range of activities and has the essential knowledge, understanding and associated skills underpinning competency.

Currency of Evidence

Evidence must be relevant to what is outlined in competency standard units and not outdated or irrelevant.

Note: The deeming of competence at a point in time does not mean that competence exists for all time; competency must be maintained by use and/or retraining. Also refer to Section 3.9 Guide to Assessment Methods and Items for more detailed information on currency.

The principle to be applied in the Electricity Supply Industry – Generation Sector for currency of evidence is that claims are to be fully substantiated through both direct and supporting assessment processes.

Additionally, assessment processes must satisfy the requirement for currency in relation to evidence of competency in terms of technology and/or processes and recency of application.

If there has been a recent change in technology, then evidence of actions before such change is unlikely to reflect the required currency. Similarly, if the individual claiming competency has not performed/applied that competency for extensive periods of time then documentary evidence would not suffice as a basis of assessment.

Authenticity

Evidence is to be genuine and relate to the person being assessed, and no one else.

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By way of supporting and reinforcing both the concept of competency and the competency standard units as the currency for the Vocational Education and Training (VET) system, the Electricity Supply Industry – Generation Sector embraces the following tenets:

- Assessment (summative or final) is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment.
- Simulation must be in accord with any prevailing industry policy. It is recognised that in some circumstances, assessment may occur outside the workplace, however this should only occur where necessary and in accord with any industry policy. In relation to this Training Package the Industry Skills Council for ElectroComms and EnergyUtilities, EE-Oz Training Standards, have developed an industry Simulation Policy. This can be accessed from the EE-Oz Training Standards website at: www.ee-oz.com.au.

All persons may claim formal recognition for an assessment of an individual competency standard unit or a group of units.

All persons have the right to have relevant competencies recognised through the most expeditious assessment system and method.

Under-represented groups are not biased from participation and access.

Regulatory/Context of Assessment

Competency is to be determined on evidence of having consistently performed across a representative range of specified equipment, processes and activities for the scope of work and/or endorsement for which competency is being sought; autonomously and to requirements. Equivalent evidence from other sources, eg. formal assessment is also acceptable.

With respect to the essential knowledge and associated skills component of each competency standard unit, assessment activities shall be in accordance with the approach required by the regulatory environment. This may include the use of industry-supported essential knowledge and associated skills learning specifications structured in a conducive learning environment to facilitate the development of depth and breadth of learning, aid in retention and enhance transferability. For this component where graded assessment is a regulatory requirement, it will apply to the underpinning knowledge off-the-job component and not the competency standard unit as a whole. The Industry preference is for a percentile based graded assessment system to be used. Also, although it is preferred that assessing competency be carried out in the workplace, it can be undertaken in a simulated work environment approved for that purpose by the industry. Refer to any Industry policy that may apply in this regard.

Assessment Judgements

Attributing Competency

The deeming of competency shall be based on evidence that is sufficient, current and authentic, so that a quality low risk judgment can be made based on the assessment principles outlined herein.

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Competencies shall be attributed on evidence showing that the person deemed to be competent is able to undertake the responsibilities for all safety measures, care of technology, plant and equipment, use of standards, manuals and procedures, and care of the environment, directly related to the work function for which such competencies are required.

Note:

1. Where the consequences of unjustifiably or mistakenly deeming a person competent carries a risk of injury to persons, commerce, or damage to property and/or the environment, the level of evidence required for sufficiency is higher than where there is little risk. The risk of attributing competence to an individual should, therefore, form a critical part of the assessment process and methodology. Consideration should be given as to whether all prerequisites and/or co-requisites have been appropriately achieved.
2. The decision to attribute competence differs from training effort and delivery. The decision to attribute competence is based on evidence being present for an assessor to attribute such and not a person in learning. Learners, however, can undertake training in competency standard units without being awarded the competency standard units even when they may not have acquired in the required sequence any of the prerequisite competency standard units. However, they cannot be attributed the competency standard unit until they have acquired the prerequisite.
3. For more detailed information refer to Section 3.9 Guide to Assessment Methods and Items.

1.3.05 Assessment Processes - ESI - Generation Sector

1.3.5 Assessment Processes – Electricity Supply Industry – Generation Sector

Within the National Electricity Supply Industry – Generation Sector sampling, profiling and portfolio are recognised as the three main methods of collecting evidence to assist the assessment processes and, while they are not mandatory, they have become accepted and the preferred industry practice. It is not the purpose of these Guidelines to provide an extensive technical description of each of these methods; however, it is important to recognise the impact each will have on the management of assessment practices.

An overview of each is provided in this Guideline along with sample templates to assist Registered Training Organisations (RTOs) in planning, managing and administering training and assessment delivery.

Profiling is the Industry-preferred model for new entrant contracted entry-level employment, e.g. apprenticeships.

1. Sampling

Sampling requires evidence of competence to be derived from a limited sample of performance event(s). Technical/application skills are normally assessed by practical measures, and knowledge underpinning performance is assessed, typically in conducive learning environments like classrooms, by conventional written or oral questioning.

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2. Profiling

Profiling requires the progressive collection of many samples through structured documentation and progress summative reporting. Progressive monitoring of direct and possibly indirect evidence, over an extended period of time is used to assist in intervention and, making judgements about the developing competency profile of the candidate/learner. The focus of evidence collection is set against the Elements; Range Statement; and critical aspects detailed in the competency standard units and complemented with the level of supervision applied. The evidence collection process is staged against known and predefined work performance outcomes as specified in the Competency standard units. Profiling will assist in obtaining a series of periodical audit assessments and/or a final holistic assessment event where regulatory/licensing requirements apply. Profiling is the preferred industry model that assists with assessment for entry-level contracted employment. Technical educational achievements may be incorporated in the Profiling Model or augment information gathered directly from the workplace into the profile. In the latter case it is preferred that a final summative and holistic assessment event be applied prior to the issuance of the qualification or relevant Statement of Attainment.

3. Portfolio

The Portfolio approach is best suited to assessment conducted as Recognition of Prior Learning (RPL) and is to be in accord with AQTF Standard 8.2 or its replacement/equivalent. It requires the collection or build-up of indirect evidence of an individual's competence.

The Portfolio of evidence could include Statements of Attainment issued by other RTOs (Mutual Recognition AQTF Standard 5), suitably focused references and testimonials, formal project appraisals, work records and any other evidence which is current and relevant to the competencies sought.

Opportunities for Combined Approaches

The assessment processes described above are not mutually exclusive and a combination of approaches may be implemented. The process selected will be acceptable to the industry if the outcome is valid, the approach supports industry-wide consistency, the requirements of the Competency standard units are satisfied and in accordance with the preferred industry approach and costs are acceptable to the industry.

1.3.06 Assessor Requirements

1.3.6 Assessor Requirements

This section identifies the mandatory competencies for assessors and clarifies how others may contribute to the assessment process where one person alone does not hold all the required competencies. [Refer to the Australian Quality Training Framework, Standards for Registered Training Organisations, Standard 7.3 (a) and (b)]

The integrity of the National Electricity Supply Industry – Generation Sector assessment processes is centred on the need for all assessments to be conducted under the direction or the authority of a Registered Training Organisation using qualified assessors who may function with or within the Registered Training Organisation.

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Within an assessment process, responsibility for some activities may be delegated and it is therefore not necessary that every aspect of assessment must be personally and directly attended to by a qualified assessor. For example, in a long term profiling process the qualified assessor may establish with an approved industry data gathering administrator/manager the system and identify the evidence required. They may then cause the evidence to be gathered by others after which they will examine the evidence and make judgments.

The partnership between assessors and other competent persons is essential if the information is to be qualitative. It should be noted that technical assessment responsibility and systems accountability may only be exercised by a Registered Training Organisation using qualified assessors.

Assessor Qualifications

Assessments against the competencies in this Training Package will be carried out in accordance with these endorsed guidelines. The guidelines include the necessary qualifications for those conducting assessments and provide for those situations where more than one person may contribute to the assessment and where the required technical and assessment competencies may not be held by any one person.

The Assessment for Competency

Assessors are to be competent in the competencies which they are to assess or are to be assisted by an appropriate subject matter expert who is currently competent in the unit being assessed. This may also include such things as language literacy and numeracy (LLN), cultural diversity and under-represented groups, environmental, industrial, occupational health and safety (OHS).

Assessors (and their subject matter expert) are to know current industry practices for the job or the role against which the performance is being assessed, and practice the necessary interpersonal skills required in the assessment process.

All persons required to plan, assess, develop or validate assessment-related matters are to be currently competent and comply with the Australian Quality Training Framework, Standards for Registered Training Organisations, Standard 7.3 (a) and (b)].

Using Qualified Assessors

All assessment is to be under the authority of a formally qualified assessor. Within this constraint, the Registered Training Organisation may adopt any or all of the following processes:

- using a workplace assessor who is currently competent and complies with the Australian Quality Training Framework, Standards for Registered Training Organisations, Standard 7.3 (a) and (b) and the relevant industry vocational competencies
- using a workplace assessor who is currently competent and complies with the Australian Quality Training Framework, Standards for Registered Training Organisations, Standard 7.3 (a) and (b) and who has ready access to another person who is competent in, and can advise the assessor on, the relevant vocational competencies to at least the level being assessed

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- using an assessment panel which includes at least one person who is currently competent and complies with the Australian Quality Training Framework, Standards for Registered Training Organisations, Standard 7.3 (a) and (b) as well as at least one person who is competent in the relevant vocational competencies to at least the level being assessed
- using an external assessor who is currently competent and complies with the Australian Quality Training Framework, Standards for Registered Training Organisations, Standard 7.3 (a) and (b) but with the assessment evidence being collected, utilising industry endorsed assessment procedures, by a workplace supervisor who has the relevant vocational competencies to at least the level being assessed
- using a workplace supervisor, with the relevant vocational competencies to at least the level being assessed, who utilises industry endorsed assessment procedures with the outcome being validated by an externally qualified assessor who is currently competent against the assessor standards and complies with the Australian Quality Training Framework, Standards for Registered Training Organisations, Standard 7.3 (a) and (b).

Notwithstanding, the industry would expect, in relation to the new entrant pathway, that in all instances the Registered Training Organisation will retain the responsibility of managing the competency development training program and related plan, the ultimate attributing of competence against Competency standard units using qualified assessors, and the issuing of qualifications, and/or Statements of Attainment. It will also include any additional information that may be required for licensing requirements and specified by regulators or Industry.

The process should be undertaken in accordance with the recognition processes defined by relevant training authorities.

Assessor Competencies

The AQTF and VET Quality Framework (Standards and Requirements)" specifies mandatory competency requirements for assessors. For information, Element 1.4 from the AQTF 2007 Essential Standards for Registration follows:

1.4 Training and assessment are conducted by trainers and assessors who:

- have the necessary training and assessment competencies as determined by the National Quality Council or its successors, and
- have the relevant vocational competencies at least to the level being delivered or assessed, and
- can demonstrate current industry skills directly relevant to the training/assessment being undertaken, and
- continue to develop their Vocational Education and Training (VET) knowledge and skills as well as their industry currency and trainer/assessor competence.

* See AQTF 2010 Users' Guide to the Essential Standards for Registration – Appendix 2

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All assessors who are engaged in assessing against this Training Package must be engaged by an RTO or be acting under the registration of an RTO (for example, an assessor working in an enterprise, or a consultant that has a partnership arrangement with the RTO).

This Training Package provides a range of options for meeting these assessor requirements. Assessments can be undertaken in a variety of workplace and enterprise contexts by individual assessors, partnerships involving assessors and technical experts or teams of assessors.

The options below show how the requirement to use qualified assessors can be met.

Assessors, Technical Experts and Workplace Supervisors

Single Assessor – Single Arrangement

Where an individual assessor conducts the assessment the assessor is required to:

- hold formal recognition of competence in the relevant units in the Training Package for Training and Assessment
- be deemed competent and, where possible, hold formal recognition of competence in the specific Competency standard units in this Training Package, at least to the level being assessed.

In addition, it is recommended by the industry that the assessor can:

- demonstrate current knowledge of the National Electricity Supply Industry – Generation Sector, industry practices, and the job or role against which performance is being assessed
- demonstrate current knowledge and skill in assessing against this Training Package which contains the vocational standards for industry in a range of contexts
- demonstrate the necessary interpersonal and communication skills required in the assessment process
- continue to meet the requirements of the industry
- ensure assessment is consistent with the Australian Quality Training Framework Standards for Registered Training Organisations
- promote confidence in the system and the assessment outcomes on the part of industry, employers, enterprises, unions, employees, trainees, assessors and trainers
- ensure assessment processes and outcomes are valid, reliable, fair and flexible
- support RTOs in effectively carrying out their responsibilities
- participate in professional development
- have relevant work experience
- participate in professional/industry networks and assessor programs
- have recent planning and review of assessment activities
- participate in assessment validation processes
- have recent assessment and/or workplace training activities.

Partnership Arrangement

Option 1 — Working with a Technical Expert

An assessor works with a technical expert to conduct the assessment.

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A technical expert is one that is required to be deemed currently competent and, where possible, hold formal recognition of competence in the specific competency standard units from this Training Package at least to the level being assessed.

In addition, it is recommended that the technical expert is able to:

- demonstrate current knowledge of the industry, industry practices, and the job or role against which performance is being assessed;
- communicate and liaise with the assessor throughout the assessment process.

Option 2 — Working with a Workplace Supervisor

An assessor works with workplace supervisor in collecting evidence for valid assessment.

The assessor is required to:

- make the assessment decision
- demonstrate a capability to assess using a workplace supervisor as a valid and reliable source of evidence collaboration
- communicate and liaise, where appropriate, with the workplace supervisor throughout the assessment process.

A workplace supervisor is required to be deemed currently competent and, where possible, is to hold formal recognition of competence in the specific competency standard units from this Training Package at least to the level being assessed.

In addition, it is recommended that the workplace supervisor is able to:

- demonstrate current knowledge of the industry, industry practices, and the job or role against which performance is being assessed
- communicate and liaise, where appropriate, with the assessor throughout the assessment process
- use agreed practices to gather and record evidence for the assessor to use in making a valid judgement on competency.

Assessment Team/Panel

A team works together to conduct the assessment.

Members of an assessment team or panel that comprises assessment and industry experience and expertise works together in the collection of evidence and in making judgements about competency. The members of the team must include at least one person who:

- holds formal recognition of competence in training and assessment in the relevant units in the Training and Assessment Training Package
- is deemed competent and, where possible, holds formal recognition of competence in the specific Competency standard units from this Training Package at least to the level being assessed, and where not technically competent uses team/panel members with current technical competence in requisite units.

It is recommended that members of the team/panel involved in the assessment are able to demonstrate:

- current knowledge of the industry, industry practices, and the job or role against which performance is being assessed

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- current knowledge and skill in assessing against this Training Package in a range of contexts
- the interpersonal and communication skills required in the assessment process and liaise with other team/panel members throughout the assessment process.

Assessments against the competencies in the Training Package will be carried out in accordance with these endorsed guidelines. The guidelines include the necessary qualifications for those conducting assessments and provide for those situations where more than one person may contribute to the assessment and where the required technical and assessment competencies may not be held by any one person.

1.3.07 Assessment Tools

1.3.7 Assessment Tools

This section provides an overview of assessment tools and their suggested use in the industry.

Use of Assessment Tools

Assessment resources provide a means of collecting the evidence that assessors use in making judgements about whether candidates have achieved competency. In some cases, assessors may use prepared assessment materials, such as those specifically developed to support this Training Package — Training and Assessment Advice Manual for the National Electricity Supply Industry – Generation Sector Training Package UEP06, available from EE-Oz Training Standards (www.ee-oz.com.au). Alternatively they may develop their own assessment materials to meet the needs of their clients by utilising pre-developed training and assessment instruments included in Section 3.8 National Electricity Supply Industry – Generation Sector Guidelines for designing assessment materials.

Using Prepared Assessment Tools

If using prepared assessment materials, assessors should ensure that the materials are benchmarked or mapped against the current version of the relevant competency standard unit(s) and any industry-preferred model and supported by the industry. This can be done by checking that the materials are listed on the Training.gov.au (http://www.training.gov.au) or EE-Oz Training Standards (www.ee-oz.com.au). Specific materials on the list have been noted by the National Quality Council (NQC) as meeting their quality criteria for Training Packages.

Developing Assessment Tools

When developing their own assessment materials, assessors must ensure that the tools:

- are benchmarked against the selected competency standard unit(s)
- are benchmarked against the industry-preferred competency assessment model
- are reviewed as part of the validation of assessment strategies as required under AQTF Standard 9.2 i of the Standards for Registered Training Organisations
- meet the assessment requirements expressed in the AQTF 2010 Essential Standards for Initial and Continuing Registration.

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- A key reference for assessors developing assessment tools is TAE10 Training and Education Training Package.

Language, Literacy and Numeracy

The design of assessment tools must reflect the language, literacy and numeracy competencies required for the performance of a task in the workplace and not exceed these expectations. Guidance on the appropriate level of LL&N skills to best equip the candidate for successful achievement is provided within each unit of competency at section 2.2) Literacy and numeracy skills.

Conducting Assessment

This section details the mandatory assessment requirements and provides information on equity in assessment including reasonable adjustment.

Mandatory Assessment Requirements

Assessments must meet the criteria set out in the AQTF 2010 Essential Standards for Initial and Continuing Registration. For information, the mandatory assessment requirements from Standard 1 from the AQTF 2010 Essential Standards for Initial and Continuing Registration are as follows:

1.5 Assessment, including Recognition of Prior Learning (RPL):

- meets the requirements of the relevant Training Package or accredited course
- is conducted in accordance with the principles of assessment and the rules of evidence
- meets workplace and, where relevant, regulatory requirements
- is systematically validated.

Assessment of Employability Skills

Employability Skills are integral to workplace competency. As such, they must be considered in the design, customisation, delivery and assessment of vocational education and training programs in an integrated and holistic way, as represented diagrammatically below.

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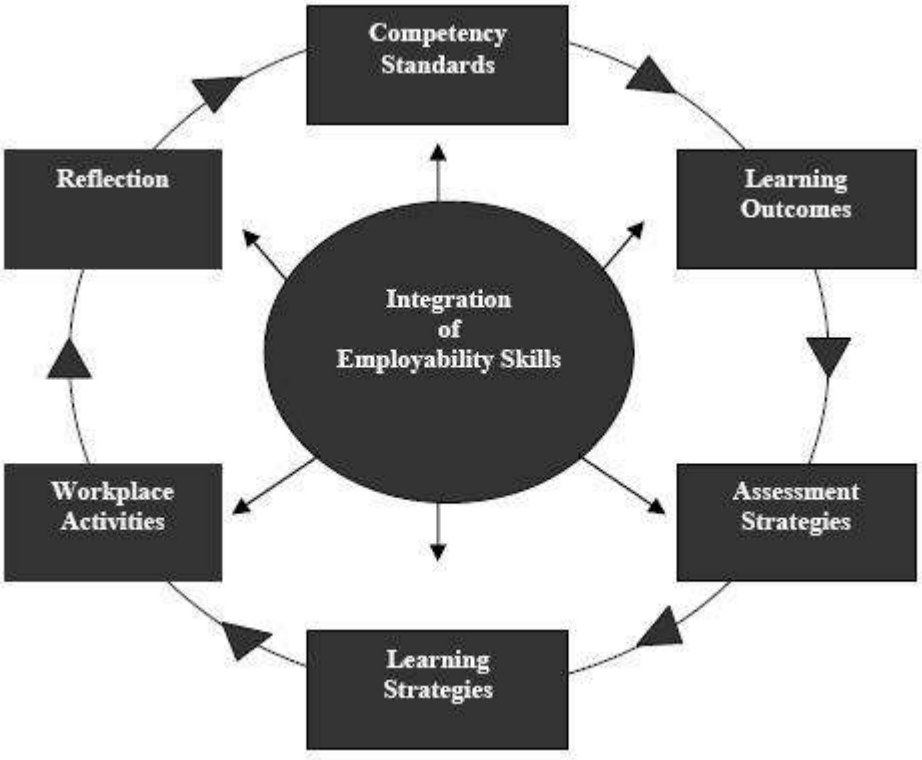

Employability Skills are embedded and explicit within each unit of competency. Training providers must use Employability Skills information in order to design valid and reliable training and assessment strategies. This analysis could include:

- reviewing units of competency to locate relevant Employability Skills and determine how they are applied within the unit
- analysing the Employability Skills Summary for the qualification in which the unit or units are packaged to help clarify relevant industry and workplace contexts and the application of Employability Skills at that qualification outcome
- designing training and assessment to address Employability Skills requirements.

The National Quality Council has endorsed a model for assessing and reporting Employability Skills, which contains further suggestions about good practice strategies in teaching, assessing, learning and reporting Employability Skills. The model is available from http://www.training.com.au/.

The endorsed approach includes learners downloading qualification specific Employability Skills Summaries for Training Package qualifications from an online repository at http://employabilityskills.training.com.au

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Access and Equity

An individual's access to the assessment process should not be adversely affected by restrictions placed on the location or context of assessment beyond the requirements specified in this Training Package.

Reasonable adjustments can be made to ensure equity in assessment for people with disabilities. Adjustments include any changes to the assessment process or context that meets means the individual needs of the person with a disability, but do not change competency outcomes. Such adjustments are considered 'reasonable' if they do not impose an unjustifiable hardship on a training organisation or employer. When assessing people with disabilities, assessors are encouraged to apply good practice assessment methods with sensitivity and flexibility.

Reasonable adjustments

It is important that education providers take meaningful, transparent and reasonable steps to consult, consider and implement reasonable adjustments for students with disability.

Under the Disability Standards for Education 2005, education providers must make reasonable adjustments for people with disability to the maximum extent that those adjustments do not cause that provider unjustifiable hardship. While 'reasonable adjustment' and 'unjustifiable hardship' are different concepts and involve different considerations, they both seek to strike a balance between the interests of education providers and the interests of students with and without disability.

An adjustment is any measure or action that a student requires because of their disability, and which has the effect of assisting the student to access and participate in education and training on the same basis as students without a disability. An adjustment is reasonable if it achieves this purpose while taking into account factors such as the nature of the student's disability, the views of the student, the potential effect of the adjustment on the student and others who might be affected, and the costs and benefits of making the adjustment.

An education provider is also entitled to maintain the academic integrity of a course or program and to consider the requirements or components that are inherent or essential to its nature when assessing whether an adjustment is reasonable. There may be more than one adjustment that is reasonable in a given set of circumstances; education providers are required to make adjustments that are reasonable and that do not cause them unjustifiable hardship.

The Training Package Guidelines provides more information on reasonable adjustment, including examples of adjustments. Go to:

http://www.deewr.gov.au/tpdh/Pages/home.aspx

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1.3.08 Guidelines for Designing Assessment Materials

1.3.8 Guidelines for Designing Assessment Materials

Assessment materials are developed, designed and implemented by appropriately authorised and competent assessors. Materials may range from relatively straight forward questions/answers and task tests to quite elaborate simulations for assessing concepts and values. Assessment materials need to facilitate assessment by:

detailing the personnel and material preparations required to support the assessment process

- establishing and/or confirming the circumstances under which the assessment is to take place
- detailing the evidence to be collected and the method(s) to be used to do this
- providing for the systematic review/analysis of the evidence and for the making of logical and supportable judgments
- providing the means for the recording of the process and the judgments as required and in accordance with any regulatory and/or industry-preferred arrangement
- providing a basis for post-assessment

providing counselling and guidance for the candidate

identifying specialist technical advice related to such things as OHS, LLN, environmental and equity matters.

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Assessment Material Design Process

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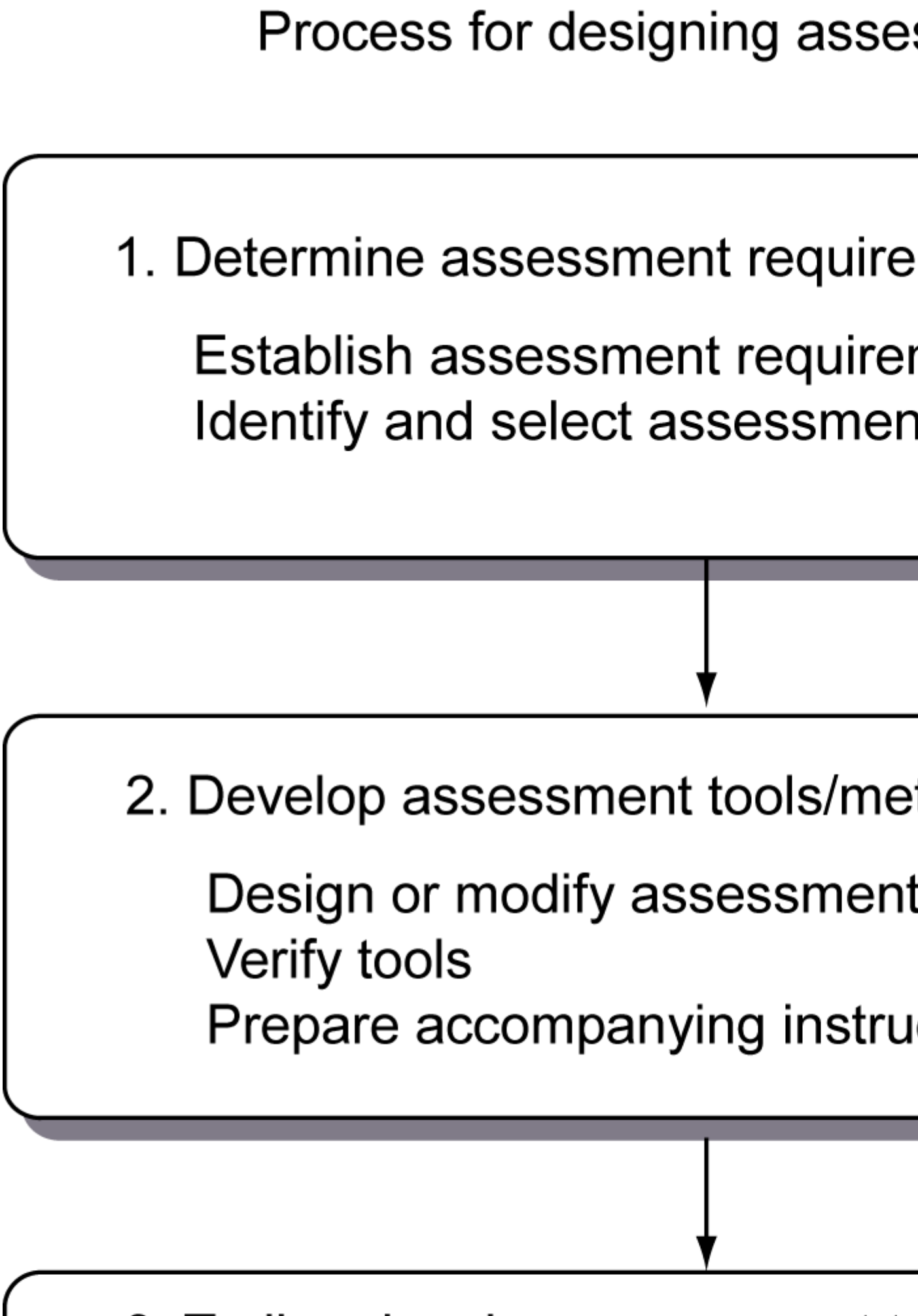
Process for designing asse
1. Determine assessment require
Establish assessment requirer
Identify and select assessmen
2. Develop assessment tools/me
Design or modify assessment
Verify tools
Prepare accompanying instru

a) Determine assessment requirements

Identify and select assessment tools/methods

The assessor will be required to identify and select the assessment methods consistent with National Electricity Supply Industry – Generation Sector assessment guidelines and procedures.

In developing tools and methods the assessor will need to determine the range of methods appropriate to the assessment context and the characteristics of the person being assessed. The assessor may use the following questions when designing the assessment method:

Is the data gathering process sufficient, timely, valid and reliable to ensure the decision about competence relates to the overall requirements of the unit?

a) Do you always need to assess real work?

How is the critical evidence specified?

How many assessment tasks are required to collect the critical evidence of competency?

Which assessment tasks will provide broad coverage of the Range Statement?

a) Are there any skills that the candidate should have or can develop before they are assessed for the unit?

b) Develop assessment tools/methods

Design or modify assessment tools

The assessor will be required to design or modify existing assessment tools so that their format, language, literacy and numeracy requirements are appropriate to the characteristics of the assessment context and the person being assessed.

Verify tools

The assessor will need to verify the assessment tools, which maintain validity but are easy to administer and allow sufficient flexibility to meet the range of possible assessment contexts.

Prepare accompanying instructions

The assessment system/process must be comprehensively and clearly documented so that the stages of assessment and their constituent parts may be observed and evaluated. The assessment materials must relate directly to the competency standard unit or group of units making up a qualification and address the totality of competency in a realistic, holistic and effective way.

c) Trial and review assessment tools

Trial and validate assessment tools

The assessor will be required to trial and validate the assessment methods with a representative group of people similar to those who will ultimately be assessed. Once trials are conducted the assessor will need to seek responses from all parties and compile and analyse these responses.

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Evaluate assessment methods

The assessor will evaluate the assessment methods and tools for clarity, reliability, validity, fairness and cost-effectiveness.

Make improvements

The assessor will modify the assessment tools based on the responses to the trials.

Ratify procedures

The assessor ratifies, with relevant people in the National Electricity Supply Industry – Generation Sector, procedures of the evidence requirements, assessment methods and assessment tools and the processes used in developing them.

Assessment Material Requirements

Essential requirements to be met by assessment materials include the following:

Assessment of competency standard units

Assessment must directly address the competency standard unit or group of units making up a qualification or skills cluster and, within this, satisfy the critical aspects of evidence including the related Performance Criteria, Range Statement and Essential Knowledge and Associated Skills.

Assessment of practical applications

Summative assessment of practical applications should, whenever possible and practicable, be conducted in a real work environment or in a realistically simulated work environment. Removal of the summative assessment from the real work environment should occur only to the extent necessitated by circumstances such as safety, noise, excessive cost and disruption to equipment operation, and access to the required work.

Learning outcomes or other curricula documents

Are not to be the primary focus of summative assessment unless their direct relationship to the competency standard unit(s) is formally approved by industry and recorded.

Assessment of essential theory

Summative assessment of the theory (essential knowledge and associated skills) underpinning competent performance is to be sufficiently rigorous and searching to ensure that individuals comprehend why they are doing something, the options they may use to achieve the required goal, and the fact that they can recall and/or locate and, interpret and transfer this information in varying contexts if it is needed at some other time. Typically, the specific level of depth and breadth the individual is required achieve is contained in industry and RTO sponsored essential knowledge and associated skills learning specifications that are aligned to respective competency standard units.

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Assessment of learners with low language/literacy/numeracy skills/under-represented groups

Assessment systems need to be capable of being applied in cases of low language/literacy/numeracy skills/under-represented groups. Reasonable adjustment strategies to address assessment of those with low language, literacy and numeracy skills and under-represented groups should be included in any Assessment Materials used by Registered Training Organisations, and be consistent with the quality assurance requirements of State Training Authorities for registration.

Range of Assessment Methods and their Uses

Types of Assessment

A variety of assessment types apply and can be used individually or in combination. These are:

Direct observation.

Observe the learner carrying out their usual practical tasks in the workplace. This may be accompanied by questions. Direct observation is probably the easiest and most convenient method of assessment.

Third party reports.

Information provided by the immediate supervisory or other appropriate persons. An external assessor may not have the opportunity to make multiple observations of a candidate over a period of time, unlike an internal (in-house) assessor. The external assessor may obtain third party reports to supplement an assessment.

Demonstration and questioning.

The candidate gives a demonstration of a practical task. If there is no opportunity to observe this competency in the standard work environment, the assessor may ask the candidate to provide a practical demonstration. The assessor can see both the process and the finished product.

Pen and paper tests and essays.

These are used to measure the extent of knowledge or may test problem-solving capability. They can compliment practical demonstration.

Oral tests.

These can be an adjunct to practical demonstration.

Projects.

These tend to be unsupervised. The assessor uses the final product as a basis for judgement.

Simulation.

This may involve an off-site practical test. The actual tasks and conditions are similar to real life situations and are in accord with prevailing industry policy enunciated by the Industry Skills Council for the industry. A Simulation Policy has been developed and can be obtained at www.ee-oz.com.

Portfolios.

These are used for assessing skills achieved in the past. They can include work samples.

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Profiling.

Information gathered over time from a structured profiled data entry card and resultant report.

Assessment Methods

Assessment methods must be appropriate to the situation. Learners can be encouraged to use these methods for self-assessment. Combinations of these methods will be required for most situations (e.g. observations and oral questioning). The recommended assessment methods for collecting the various kinds of evidence required to determine the candidate's competency are:

A — Oral questioning

B — Structured observation of work

C — Indirect supporting evidence (supervisor's reports).

Not all the methods need to be used. For example, during the assessment period the assessor may find that they don't need all three methods to collect sufficient evidence. The assessor may also plan to use other, equally valid, combinations of assessment methods. It is recommended that assessors use open questions in conjunction with direct observations to assess the candidate's ability to:

- apply relevant knowledge to the particular task
- perform the required tasks safely and efficiently
- handle unforeseen contingencies and circumstances
- recognise and solve problems associated with the whole job (which may not necessarily occur during the assessment).

It is recommended that supervisor's reports or verified calculations are used to confirm that workplace job activities have been completed on time and meet the required specifications. This is particularly relevant when the assessor is not for the total duration of the workplace job activity and/or the learner/candidate works as part of a team.

More information is contained in the following section – Guide to Assessment Methods and Items.

Sample assessment instruments to support training and assessment material design

Information regarding assessment material design, training and assessment activities, and sample assessment materials against competency standard units in this Training Package is included in Appendix B – Sample assessment instruments to support training and assessment material design.

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1.3.09 Guide to Assessment Methods and Items

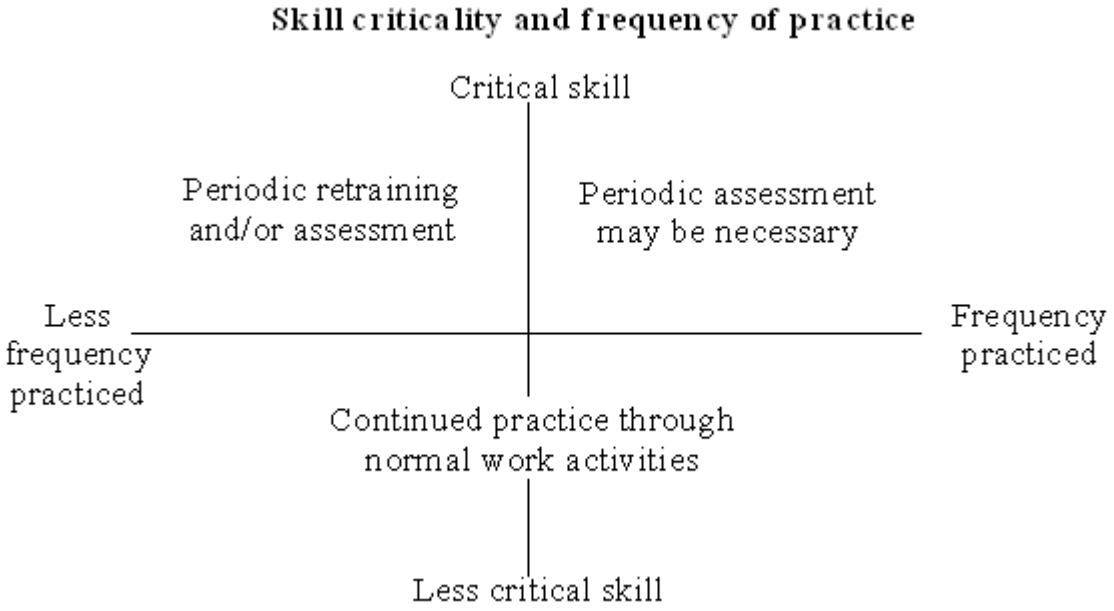
1.3.9 Guide to Assessment Methods and Items

(Informative)

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity and electrical equipment carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. These considerations can be summarised as follows:



Irrespective of these considerations the assessment methods and instruments used should satisfy the conditions associated with sufficiency, currency, authenticity, validity, reliability, and be holistic in nature.

The following Table Assessment Methods and Items provides a summary of assessment methods in common use and the situations in which they may apply.

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Table 1 – Assessment Methods and Items

Assessment method	Appropriate instruments	Valid purposes or use	Conditions and numbers	Time constraints	Repeat assessments
Written objective tests	True/false Multiple choice Matching Completion	Confirming essential factual knowledge, principles Assessing deduction, transfer of knowledge Complementing other methods	Controlled classroom High level supervision Large numbers	Moderate	Many
Written responses, short and extended answers	Calculations Definitions, explanations Essays	Assessing use of information Application of knowledge General ideas and solutions Research, organisation and expression of concepts or ideas	Test condition as above or Minimal supervision, and assistance	Moderate	Many
Oral test/ technical interview	Set question Scenarios	Assessing depth and breadth of knowledge Application of knowledge Relative to experience	Interview condition One to one	Moderate	Many
On job or workplace assessment	Observation, checklist Product assessment Questioning to complement observations	Identifying mastery or competence of practical task, technical skill or interpersonal skill in real or simulated setting Identifying gaps in education and training	Normal working conditions Moderate level supervision One to one Avoid expensive or hazardous situations	High	Nil to many depending on assessment of product or process
Practical/ Exercises	Stimulated work exercises Structured	Checking mastery or competence of a practical task,	Controlled laboratory or field setting	Low	Several

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Assessment method	Appropriate instruments	Valid purposes or use	Conditions and numbers	Time constraints	Repeat assessments
	practical exercises Fault finding exercises	technical skill, or subset of performance in a simulated work setting	High level supervision 10 to 15		

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Assessment method	Appropriate instruments	Valid purposes or use	Conditions and numbers	Time constraints	Repeat assessments
Practical projects	Research task or investigation Product or process development Individual learning contract	Assessing integration and application of a number of work related skills to solve a given problem Assessing individual approaches, innovation, creativity Assessing interaction with others	Access to laboratory, workshop or workplace Little supervision 10 to 15	Low	Several
Assignments	Resource life Case studied Poster presentation Reports of video or speaker presentations Reports of laboratory/field work, excursions Individual learning contracts Writing simple manuals or procedures	Confirming competence to research, analyse and synthesise information Assessment of application of knowledge, skills and attitudes where practical testing is not feasible Assessment of communication skills	Moderate of level control Non-test conditions Little supervision 10 to 15	Low	Several
Personal appraisal	Checklists or criteria which enable peer or self assessment	Establishing readiness for summative assessments Assessment of an individual's performance within a team effort	Non-test conditions Little supervision Small numbers	Low	Many
Verbal	Oral exposition	Confirming understanding of	Moderate level of	Low	Several

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Assessment method	Appropriate instruments	Valid purposes or use	Conditions and numbers	Time constraints	Repeat assessments
assessment	or lecture Seminar, presentation and group discussion Oral/aural tests Interviews	principles underpinning performance Supplement other assessment methods Verification of learner's submitted work.	control High level of supervision One to one		
Profiling	Structure manual or computer-based log.	Tracks competency development against the industry standard profile specified by CSUs. Identifies when remedial action is required during development period.	Real work conditions under workplace supervision. Off-job assessment events Any number	Low / Medium	On going

1.3.10 Guidelines for Conducting Assessments

1.3.10 Guidelines for Conducting Assessments

The following guidelines describe the industry-preferred process for conducting assessments against the competency standard unit(s) in this Training Package. This process applies to all assessments conducted for the purposes of national recognition in both institutional and workplace contexts.

Assessment within the National Electricity Supply Industry – Generation Sector is to be carried out by a qualified assessor trained in the conduct of assessment:

- Assessment should be planned, arranged and organised well in advance of the event/process.
- The candidate should be involved in the planning and preparation so that their readiness and availability is assured, and their advice on evidence collection opportunities may be considered.
- The environment within which assessment is to occur is acceptable to the parties and conducive to the assessment process.
- The assessor's actions throughout the process are firm, fair, friendly and unambiguous.

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- Specific rulings on safety breaches are explained up-front and acted on in accordance with the assessment materials.
- The assessment process should contain no surprises for any party.
- Feedback is provided as required throughout the assessment process.
- Post assessment activities including recording, reporting, counselling etc. are finalised promptly.

Candidates will invariably be accepting of the outcomes of an assessment process in which:

- they consider they were treated fairly, consistently and with dignity
- they were given the full opportunity to demonstrate their capabilities
- the reasons for the assessment decisions were appropriate, logical and constructively explained
- the assessment judgements are conveyed in a sensitive and constructive manner.

The following provides an overview for assessment within the National Electricity Supply Industry – Generation Sector. It outlines the process involved in conducting assessment in both the institutional and workplace context, and consists of three major components that each assessor will need to do:

Prepare for Assessment

The assessor:

- establishes the context and purpose of the assessment

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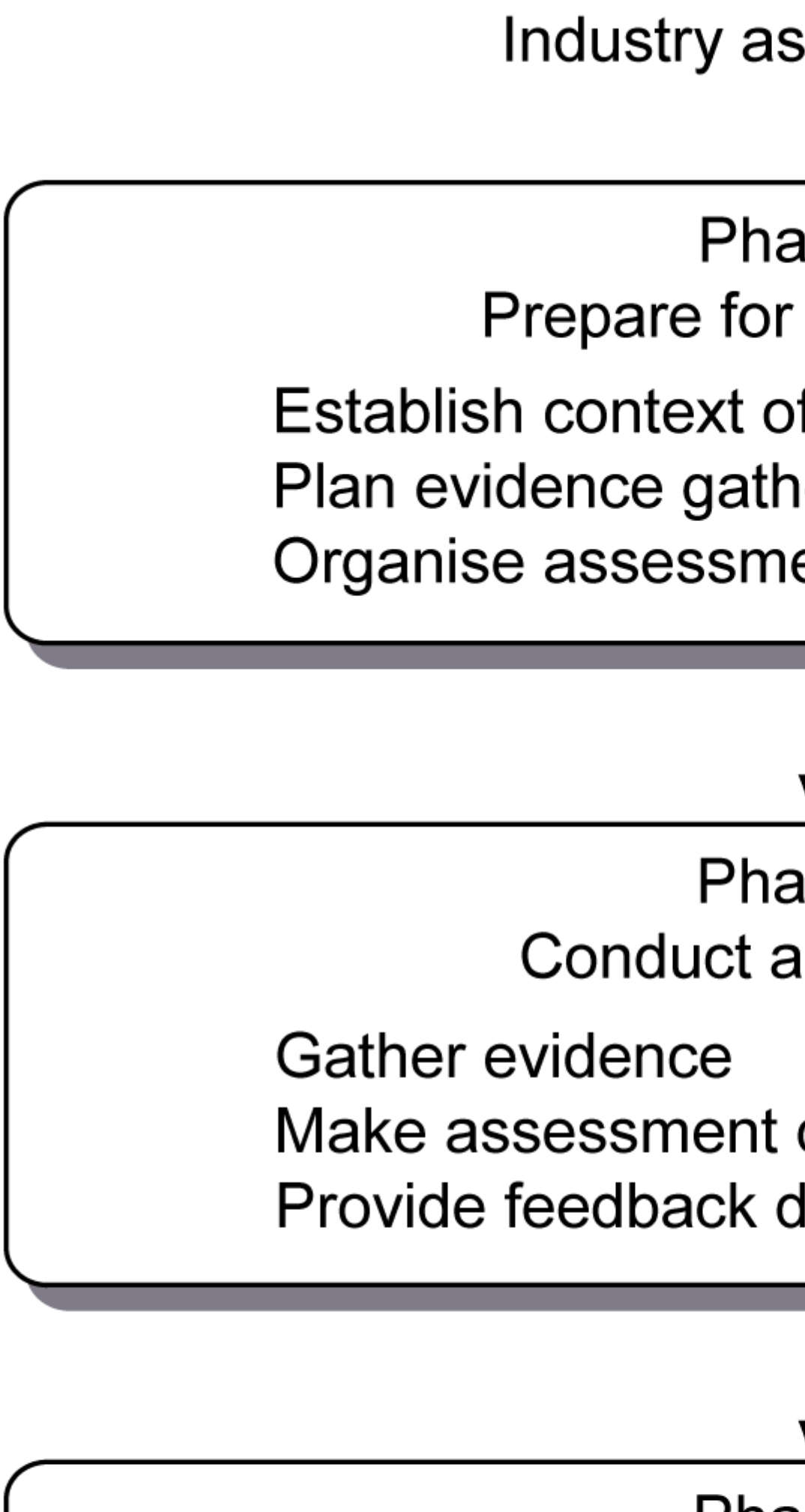
Industry as
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Prepare for
Establish context of
Plan evidence gath
Organise assessme
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Conduct a
Gather evidence
Make assessment
Provide feedback d

- identifies the relevant competency standard unit(s), assessment guidelines and qualification framework in this Training Package which contains the vocational standards for industry including the relevant performance measures applying to assessment
- identifies any NQC noted support materials that have been developed to facilitate the assessment process
- analyses the competency standards and identifies the evidence requirements;
- identifies potential evidence collection methods
- identifies issues related to techniques, OHS, language and literacy, cultural diversity, under-represented groups, key competencies and skills enabling employment.

Prepare the candidate

The assessor meets with the candidate to:

- discuss and confirm the purpose of assessment with the candidate and where appropriate, the employer
- explain the context and purpose of the assessment and the assessment process
- explain the competency standards to be assessed and the evidence to be collected and ensure the candidate has access to the relevant competency standards and other relevant information
- explain and obtain agreement to the assessment procedure
- advise on self-assessment, including processes and criteria
- outline the assessment procedure, the preparation the candidate should undertake, and answer any questions
- assess the needs of the candidate and, where applicable, negotiate reasonable adjustment for assessing people with disabilities without compromising the integrity of the competencies
- seek feedback regarding the candidate's understanding of the competency standard unit(s), evidence requirements and assessment process
- determine if the candidate is ready for assessment and, in consultation with the candidate, decide on the time and place of the assessment
- develop an assessment plan
- discuss the National Electricity Supply Industry – Generation Sector and enterprise assessment policy with the candidate (i.e. how the competencies to be assessed will fit in with the Industry training policy and preferred framework or enterprise arrangements for training and assessment. The assessor should also understand what the candidate has done to acquire the knowledge and skills).

Plan and prepare evidence-gathering process

Practical assessment should preferably be conducted on site. However, if on-site practical assessment is not possible then off-site assessment at a mutually agreeable site could be appropriate. It can be part of the current work (i.e. observation of current tasks) or a demonstration, i.e. a simulated task.

The assessor must:

- establish a plan for gathering sufficient quality evidence about the candidate's performance in order to make the assessment decision (and involve industry representatives in the development of plans for the validation of assessment)

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- identify opportunities to gather evidence of competence which occurs as part of the workplace activities
- ensure the planned approach to gathering evidence will provide sufficient, reliable, valid and fair evidence of competence
- source or develop assessment materials to assist in the evidence gathering process
- choose the techniques that will be used to assess the candidate's knowledge and skill
- organise equipment or resources required to support the evidence gathering process
- check the assessment environment permits fair, valid and reliable assessment and that it is safe and accessible
- inform other relevant people of assessment plans, coordinate and brief other personnel involved in the evidence gathering process
- identify the need to gather additional evidence which may not occur as part of workplace activities
- consider issues related to techniques, OHS, language and literacy, cultural diversity, under-represented groups, key competencies and skills enabling employment.

Collect the evidence and make assessment decisions

The assessor must:

- establish and oversee the evidence gathering process to ensure its validity, reliability, fairness, flexibility and consistency
- collect appropriate evidence and assess this against the Elements, Performance Criteria, Range Statement and Evidence Guide in the relevant competency standard unit(s)
- evaluate evidence in terms of the four dimensions of competency — task skills, task management skills, contingency management skills, and job/role environment skills
- incorporate allowable adjustments to the assessment procedure without compromising the integrity of the competencies
- evaluate the evidence in terms of validity, consistency, currency, equity, authenticity and sufficiency
- gathers evidence related to techniques, OHS, language and literacy, cultural diversity, under-represented groups, key competencies and skills enabling employment
- consult and work with other staff, assessment panel members or technical experts involved in the assessment process
- document the evidence gathered in accordance with the assessment procedure and record details of evidence collected
- make a judgement about the candidate's competency based on the evidence and the relevant competency standard unit(s) and the criteria specified in the assessment procedure.

Provide feedback on the assessment

The assessor must provide advice to the candidate about the outcomes of the assessment process. This includes providing the candidate with:

- clear and constructive feedback on the assessment decision
- information on ways of overcoming any identified gaps in competency revealed by the assessment
- the opportunity to discuss the assessment process and outcome

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- information on reassessment and the appeals process.

Record and report results

The assessor must:

- record the assessment outcome according to the policies and procedures of the RTO
- maintain records of the assessment procedure, evidence collected and the outcome according to the policies and procedures of the RTO
- maintain the confidentiality of the assessment outcome
- organise the issuing of qualifications and/or Statements of Attainment according to the policies and procedures of the RTO.

Review assessment process

On completion of the assessment process, the assessor must:

- review the assessment process
- report on the positive and negative features of the assessment to those responsible for the assessment procedures
- if necessary, suggest to appropriate personnel in the RTO ways of improving the assessment procedures.

Participate in the reassessment and appeals process

The assessor must:

- provide feedback and counsel the candidate, if required, regarding the assessment outcome or process, including guidance on further options
- provide the candidate with information on the reassessment and appeals process
- report any disputed assessment decision to the appropriate personnel in the RTO
- participate in the reassessment or appeal according to the policies and procedures of the RTO.

Review and maintenance of the assessment system

The developer and custodian, EE-Oz Training Standards of this Training Package which contains the vocational standards for industry is responsible for the ongoing monitoring and review of these Assessment Guidelines. This process will be incorporated in the general review and maintenance of this Training Package.

1.3.11 Maintenance of Assessment Guidelines

1.3.11 Maintenance of Assessment Guidelines

The National Electricity Supply Industry – Generation Sector Assessment Guidelines were developed by, and are therefore owned by, the industry.

The Assessment Guidelines must be maintained so that it reflects the ongoing needs of the Industry sector and responds in a timely manner to changed technologies, work organisation, skills development and related circumstances.

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Responsibility for maintaining of the Assessment Guidelines is shared by the parties who constitute the sector:

- Assessment Guidelines maintenance will be coordinated and managed by EE-Oz Training Standards in its role as a declared Industry Skills Council for ElectroComms and EnergyUtilities, and
- Suggestions and proposals for changes from all parties are welcome. These should be documented and submitted to EE-Oz Training Standards the DEST declared Industry Skills Council for the ElectroComms and EnergyUtilities Industry.
-

1.3.12 General Resources

1.3.12 General Resources

Australian Quality Training Framework (AQTF) – for general information go to: http://www.dest.gov.au/sectors/training_skills/policy_issues_reviews/key_issues/nts/aqtf/what.htm

Australian Quality Training Framework (AQTF) – for resources and information go to: http://antapubs.dest.gov.au/publications/publication.asp?qsID=86

Australian Quality Training Framework Standards for Registered Training Organisations, Australian National Training Authority, Melbourne, 2001. Available in hard copy from DEST or can be downloaded from http://antapubs.dest.gov.au/publications/publication.asp?qsID=86

Training Package Development Handbook, Department of Education Science and Training, Canberra, 2006. Can be downloaded from http://www.dest.gov.au/sectors/training_skills/publications_resources/profiles/Training_Package_Development_Handbook.htm

Assessment Resources

Training Package Assessment Guides are a range of resources to assist RTOs in developing Training Package assessment materials. This project was one of several initiatives managed by the Australian Government and funded by the Department of Education, Science and Training (DEST) to facilitate the implementation of Training Packages and in particular Australian Apprenticeships. It is made up of 10 separate titles, as described at http://www.training.com.au/portal/site/public/menuitem.ad0d788e23b8ac80f9fa5a1017a62dbc/

Go to http://www.resourcegenerator.gov.au/loadpage.asp?Page=TPAG.htm

Assessment Tool Design and Conducting Assessment

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Vocational Education and Assessment Centre 1997, Designing Workplace Assessment Tools, A self-directed learning program, NSW TAFE.

Manufacturing Learning Australia, 2000, Assessment solutions, Australian Training products, Melbourne.

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Rumsey, David 1994, Assessment practical guide, Australian Government Publishing Service, Canberra.

Assessor Training

Australian National Training Authority, Facilitator Packs for Certificate IV in Training and Assessment. Available from Australian Training Products Limited go to: http://www.atpl.net.au/itemdetail.aspx?piid=9733

Innovation and Business Industry Skills Council, Facilitator Guide for TAA04 Learning Materials. Available from Innovation and Business Industry Skills Council go to http://www.ibsa.org.au/pubdetails.jsp?publication=5540

Innovation and Business Industry Skills Council, TAA04 Certificate IV in Training and Assessment Learner Guides. Available from Innovation and Business Industry Skills Council go to http://www.ibsa.org.au/downloads/TAA04_Learner_Guides.pdf

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http://www.dest.gov.au/sectors/training_skills/publications_resources/profiles/anta/profile/a_new_assessment_tool.htm

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National Assessors and Workplace Trainers Body, The evidence resource kit — containing language, literacy and numeracy video and CD ROM

National Assessors and Workplace Trainers Body, The evidence workbooks

Assessment System Design and Management

Office of Training and Further Education 1998, Demonstrating best practice in VET project – assessment systems and processes, OTFE Victoria.

Toop, L., Gibb, J and Worsnop, P, Assessment system designs, Australian Government Publishing Service, Canberra.

Western Australia Department of Training and VETASSESS 1998, Kit for Skills Recognition Organisations, WADOT, Perth

National Centre for Vocational Education and Research, 1996, Integrating assessment: removing the on the job/off the job gap, Conference papers from 4-6 June, Western Australian Department of Training.

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Wilson, P., 1993, Integrating workplace and training system assessments, Testing Times Conference, NCVER, Sydney.

Field, l., 1995, Managing organisational learning, Longman, Melbourne.

Recognition of Current Competency/ Recognition of Prior Learning

Recognition and Assessment Centre, 1994, New place: Same Skills. A guide for people from non-English speaking backgrounds, Office of Multicultural Affairs, DEET.

Recognition and Assessment Centre, A Flexible Approach to Recognition Practices: RPL as a Framework, Melbourne Recognition and Assessment Centre, PO Box 299, Somerton, Vic 3062, Telephone (03) 9254 3000.

1.3.13 Further Sources of Information

1.3.13 Further Sources of Information

This section provides a listing of useful contacts and resources to assist assessors in planning, designing, conducting and reviewing of assessments against this Training Package which contains the vocational standards for industry.

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Contact	Details
National Industry Skills Council (ISC) for the ElectroComms and EnergyUtilities Industry	**EE-OZ Training Standards** Unit 2, 48 Mort Street BRADDON ACT 2612 Telephone: 02 62627055 Fax: 02 62574222 Email: ee-oz@ee-oz.com.au Website: www.ee-oz.com.au
Western Australia ITC	**WA IEU ITC Inc** P O Box 597, BALCATTA WA 6021 Tel: 08 9240 2688, Fax: 08 9240 2930 E-mail: roberts@ieu.com.au
New South Wales ITAB	**NSW U&E ITAB** Ground floor, 68 Campbell Street SYDNEY NSW 2010 Tel: 02 9280 2986, Fax: 02 9211 6870 Email: nswueitab@ozemail.com.au
Victoria	**EPIC Industry Training** 29 Drummond St, CARLTON VIC 3053 Tel: 03 9654 1299 Fax: 03 9654 3299 Email: epicitb@epicitb.com

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Contact	Details
Tasmania	**Energy Skills Australia (TEU ITB)** Unit 4/40-50 Innovation Drive DOWSING POINT TAS 7010 Tel: 03 6273 4445, Fax: 03 6273 4446 Email:
South Australia	**Electrical, Electrotechnology, Energy & Water Skills Board** 17 Wirriga St, REGENCY PARK SA 5010 Tel: (08) 8347-4008, Fax: (08) 8219-0015 Email: admin@eeewsb.com.au
Queensland	**QUSITAB** PO Box 160, COOPERS PLAINS QLD 4108 Tel: 07 3216 9604, Fax: 07 3345 8346 Email: qusitab@qusitab.com.au
Northern Territory	**Major Industries Training Advisory Council** GPO Box 1610, DARWIN NT 0801 Tel: 08 8981 0077, Fax: 08 8941 7470 Email: mitac@mitac.org.au

Access to Assessment Resources

Learning Resources	**EE-Oz Training Standards** Unit 2, 48 Mort Street BRADDON ACT 2612 Telephone: 02 62627055 Fax: 02 62574222 Email: ee-oz@ee-oz.com.au Website: www.ee-oz.com.au **Australian Training Products Ltd** Level 25, 150 Lonsdale Street MELBOURNE VIC 3000

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PO Box 5347BB, MELBOURNE VIC 3001
Telephone: (03) 9655 0600
Fax: (03) 9639 4684
Website: http://www.atpl.net.au
Email: sales@atpl.net.au

1.3.14 Appendix A - New Apprenticeship Application

Appendix A – New Apprenticeships Application

New Apprenticeships are work related competency programs designed for entry-level contracted employment for new entrants to the industry. All qualifications in this Training Package could be open to use as New Apprenticeships and are governed by State/Territory Training Authority arrangements and their limitations.

New Apprenticeships offer both employers and employees:

- relevant training
- a range of support service arrangements.

They typically involve paid work and structured training and are underpinned by a training contract, which is registered with the relevant State/Territory Training Authority. Completion of the competency development program leads to an AQF qualification.

In some instances, and subject to any relevant State/Territory Training Authority arrangements, existing non-apprenticed workers may be eligible for New Apprenticeship opportunities. Inquiries with the relevant State/Territory Training Authority should be made in this regard.

Like traditional apprenticeships, New Apprenticeships involve a commitment from:

- the employer to provide an environment for systematic training of the New Apprentice
- the New Apprentices to apply themselves to learning the requirements of their vocation
- a Registered Training Organisation (RTO) to be responsible for providing the vocational education, training and assessment support services and the eventual issuing of a national qualification

In the National Electricity Supply Industry – Generation Sector, New Apprenticeships are available for all the qualifications outlined in this Training Package. New Apprentices seeking one of the national qualifications will be required to undergo a training program or course of study that involves learning and assessment activities. The related learning and assessment activities are documented and involve:

- the employer
- the employee
- the RTO.

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On successful completion of the training program or course of study an RTO will issue the New Apprentice a national qualification.

Entry Requirement

Under New Apprenticeships, the employer is able to determine the relevant employment criteria for recruiting a new entrant into the National Electricity Supply Industry – Generation Sector. The choice, however, is usually dependent on enterprise employment practices and needs including requirements that may be imposed by relevant regulations and codes of practice.

There is, however, a common set of attributes/profiles that are industry preferred for the recruiting of New Apprentices. Some of the more common ones are:

- Any person aged 15 years or more can apply for a New Apprenticeship.
- Most employers require applicants who have completed at least Year 10 of a secondary school education program.
- Employers customarily prefer applicants who have successfully completed Years 11 or 12 of a secondary school education program or a post secondary education pre-employment course.

Potential entrants should be aware that employers are looking for the following personal attributes:

- effective numeracy and literacy skills
- effective communications skills
- acceptable presentation
- punctuality
- a positive attitude
- interest in the industry as a career
- ability to work at heights or in confined spaces and around moving machinery
- ability to distinguish between colours.

For entry-level employment based contracted training New Apprenticeships the composition of the relevant qualification needs to be determined in accordance with the completion requirements detailed here and be subsequently agreed to between the respective parties.

General principles regarding the composition of qualifications are as follows:

- Competency Standard Units making up a qualification must be appropriate to the work being performed and be performed by the person seeking the qualification
- Competency Standard Units making up a qualification must be appropriate to the level and integrity of the qualification sought.

The terms and conditions for employment based entry-level contracted training require a training agreement or contract, which will be provided by State or Territory Training Authorities. Such an agreement is called an Apprenticeship/Traineeship Training Contract, which requires parties to the contract to select the appropriate qualification, competency standard units and to adopt an industry-preferred model or design a new training plan/program. Additionally, the responsibilities of the parties to the contract will be contained therein.

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The employment of an Apprentice (sometimes also called a Trainee) by an Employer is subject to the relevant legislation and any applicable industrial instrument, order or determination made under that related Statutory Act. Appropriate information should be obtained from relevant authorities in this regard.

General principles governing the Competency Development Program

Consultation between the RTO, the employer and apprentice/trainee will have occurred and agreement reached on the Competency Development Program that will be delivered. Typically the RTO will adopt the industry-preferred approach where regulatory arrangements are in place or design an appropriate program in concert with the Industry. The apprentice/trainee would be expected to undertake the Competency Development Program in order to attain competence in the given qualification.

The Competency Development Program

A training contract provides a description of the process for undertaking training during the life of the program. This is developed in consultation with the RTOs.

The Training Program

1. Expected duration of workplace program in hours

The training program will detail the anticipated duration in hours that the apprentice/trainee is expected to undertake in order to gain the necessary competencies. Information regarding the suggested nominal duration for respective AQF levels of New Apprenticeships is available from respective parties and includes EE-Oz Training Standards. The training plan will outline the requisite on and off-the-job arrangements that apply to it.

2. On-the-job skills development program

In consultation with the apprentice/trainee and employer, the RTO would outline how it intends to monitor the on-the-job component, i.e. providing advice on how evidence is to be gathered when the apprentice/trainee is in the workplace. Apprentices/trainees are expected to assist RTOs in gathering and submitting workplace evidence as per the industry-preferred approach. This is particularly important where regulatory arrangements are in place. RTOs in turn monitor the performance of the apprentice/trainee and provide appropriate feedback to them and the employer.

3. Off-the-job skills development program

The training contract will detail, where applicable, the off-the-job (technical education) program the RTO will deliver in order to gain the necessary underpinning skills and knowledge. This is typically a program preferred by the industry undertaken by the apprentice/trainee. For example where modules or essential knowledge and associated skills strategies apply, the number, title and duration of each will generally be advised. This will also include the expected duration of the technical educational program in hours.

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Typical duration — New Apprenticeships

In developing this Training Package due regard has been given, by industry, to a range of influencing factors associated with the typical period of employment and related training for individuals seeking a qualification, using the Australian Qualification Framework (AQF). In developing such, regard has also been given to the NQC policy on providing industry advice on this matter.

As a general rule it is expected, that by employing the respective techniques and processes detailed in the preferred and adopted industry training model, those employed and undertaking training to satisfy the outcomes of competency standard units, as new entry-level recruits, will take a "nominal duration" of employment to complete. EE-Oz Training Standards has developed industry advice in relation to the nominal duration of employment to assist users in their activities. Detailed information on typical new apprentice durations, at each of the AQF levels is available from EE-Oz Training Standards. This detail can be obtained directly from EE-Oz Training Standards or found on the EE-Oz Training Standards website at www.ee-oz.com.au. Additionally, more specific information may be contained within any related support materials that may exist as non-endorsed components of this Training Package and in particular the industry-preferred training plan applicable to each qualification.

Nominal duration of training is generally defined by State, Territory and Federal Training Authorities policies and/or regulations. Typically these are set out in State/Territory Training Package Implementation Guides. Interested State/Territory parties should ensure they refer to the relevant Training Package Implementation Guide. These can be accessed via the respective State/Territory Training Authority websites.

1.3.15 Appendix B - Sample Assessment Instruments to Support Training and Assessment Material Design

Appendix B — Sample Assessment Instruments to Support Training and Assessment Material Design

This Appendix provides advisory and sample information for assessment material design against competency standard units in this Training Package. It is principally about training and assessment activities that can be used to benchmark quality outcomes.

It provides information about assessment material design and other resources available to support implementation of the Training Package. The information contained herein shows how these resources relate to the workplace and where they can be obtained. It includes sample assessment tools (sample instruments) developed to assist those involved in benchmarking their activities for gathering evidence about workplace activities and workplace experiences for training and assessment purposes.

Sample assessment instruments included were developed for documenting workplace experiences related to the requirements of this Training Package. The assessment strategies and instruments are primarily for use as advisory information for workplace assessors and/or their agents (workplace supervisors or technical experts) who may be employees of Registered Training Organisations or enterprises.

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A number of terms used refer to aspects of implementing the Training Package. A Glossary of Terms (*see* Appendix B Enclosure C) is included to clarify the specific meaning of these terms.

This Appendix should be read in conjunction with the following publications:

- The respective volumes of this Training Package
- Training Package for Training and Assessment TAA04
- Training Acts and Regulations in the relevant Australian State or Territory
- Policies of the Registered Training Organisation (RTO) involved with training and assessment for the Industry.

Sources of Education, Training and Assessment Information

Introduction

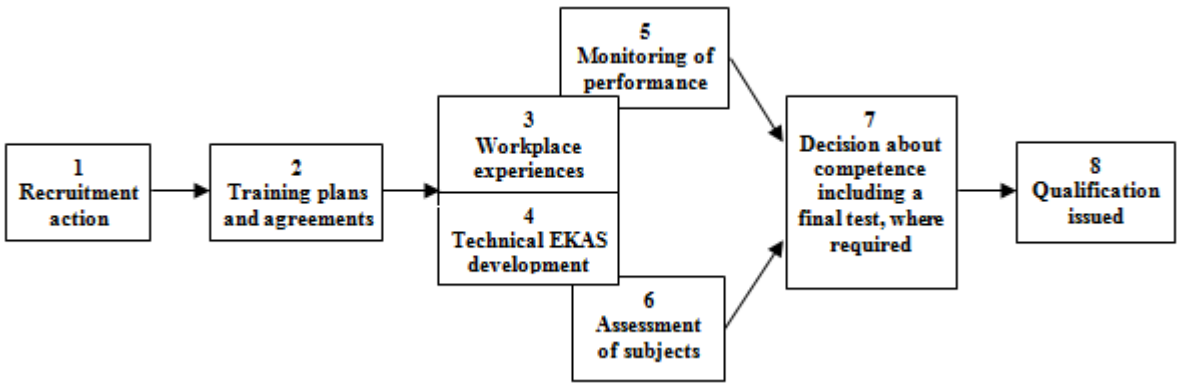
This section shows how the Training Package and associated resources relate to recruitment, training, assessment and recognition activities which may be undertaken by Industry, enterprises and/or Registered Training Organisations.

This section also introduces a competency development and/or recognition model based on combined on and off-the-job training, as well as a model that allows individuals to have previous learning and work experience recognised.

Combined on and off-the-job competency development model

The model shown below is a simplified version of the detailed contracted new entry level industry-preferred competency development model which combines on and off-the-job education, training and assessment leading to competent performance. A detailed copy of the model is available from EE-Oz Training Standards website at www.ee-oz.com. This model recognises that learning occurs as a result of:

- experience in recurring workplace events
- directed workplace learning activities
- structured off-the-job essential knowledge and associate skills technical educational activities.



Competency Development Model

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This model is structured around a new entry level learner undertaking a full competency development program. The model can also accommodate the assessment of prior learning within the continuum of new entrant to competent. In this way it is consistent with the Assessment Pathways outlined in this Assessment Guidelines part of the Training Package.

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New Entrant Training and Assessment Materials and Resource Design and Development

In designing training and assessment materials and resources to support new entrant competency development consideration should be given to the preferred Industry approach to learner development. The concept model detailed on the next page explores how training and assessment materials and resources may be best developed for one or many competency standard units. RTOs using this approach ensure increased consistency in meeting the specifications in learning and work performance against the competency standard units, and in developing the learner in a cost effective way with little disruption to the day-to-day operation of the workplace. It also assures that a learner having completed aspects of, but not the full array of, competency standard unit(s), can be accorded information that is sufficient to warrant recognition for learning content (Essential Knowledge and Associated Skills) that is transferable to other environments in the Industry.

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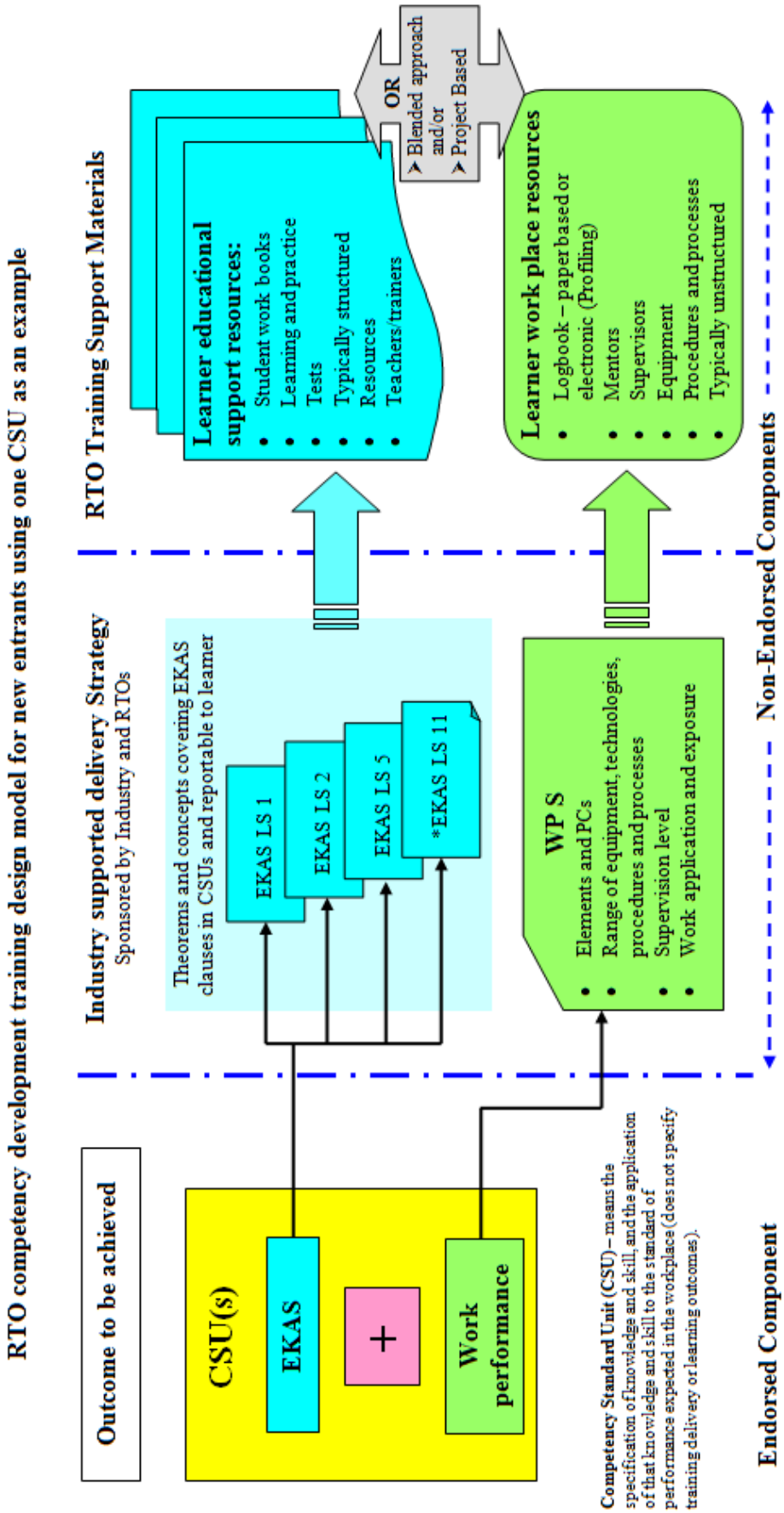

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EKAS LS – Essential Knowledge and Associated Skills Learning Specifications = where EKAS LS 1 — may cover many units, EKAS LS 2 — may cover a number of units, EKAS LS 5 — may cover several units, and/or EKAS LS 11 – may be unique to the unit (refer to Volume 1 Part 2 and Volume 2 Part 2 for more detail)

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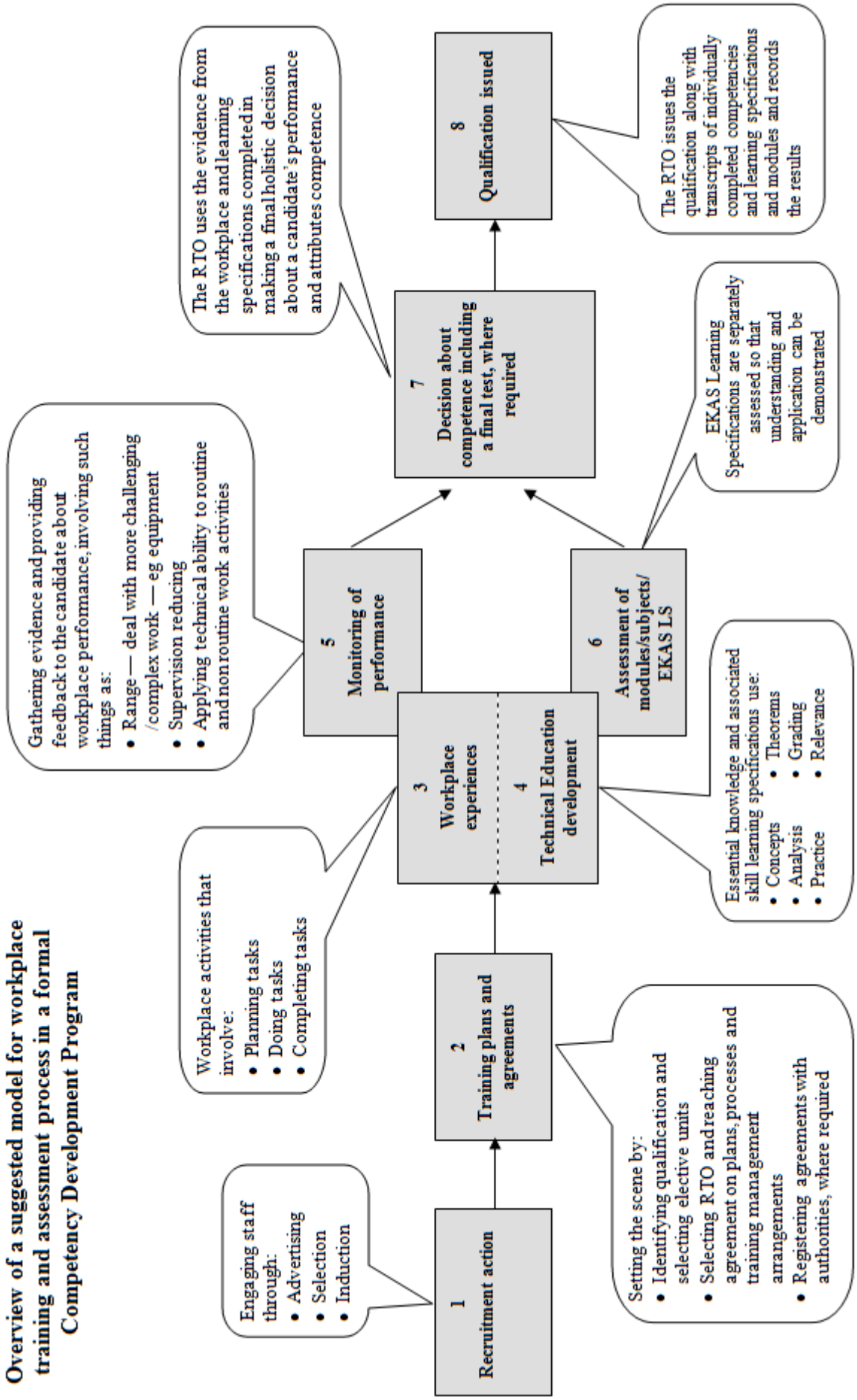

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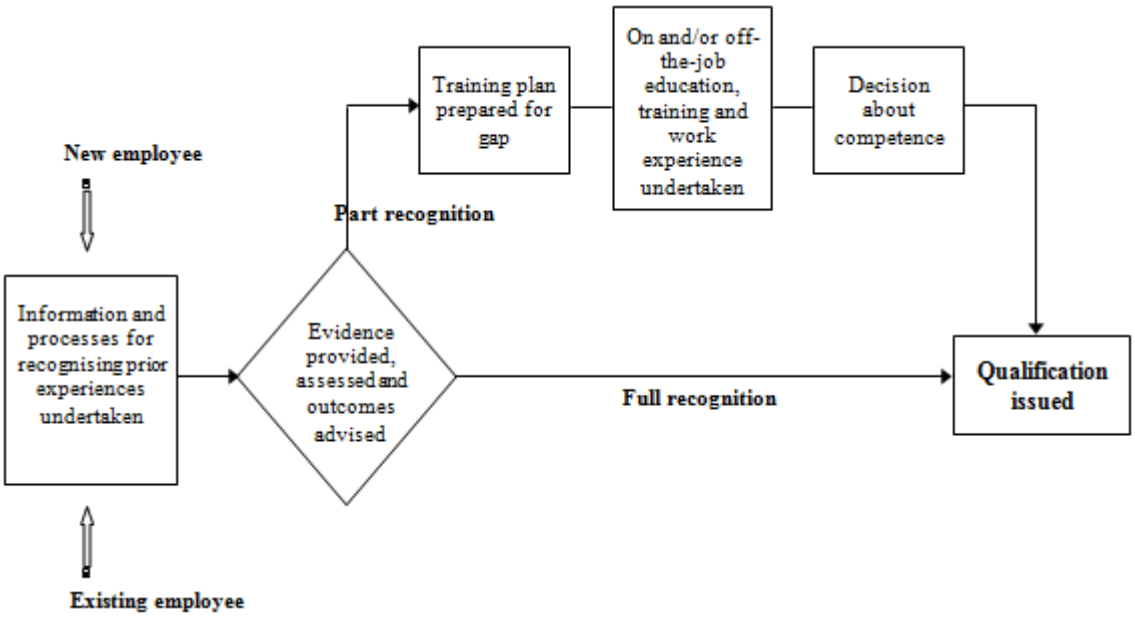
Recognition of Prior Learning/Experience Model

A typical process for candidates seeking to have their prior experiences recognised within the model is shown in the following diagram.



Learning and Assessment strategies

Introduction

The skills and knowledge required by a competent worker are described in terms of competency standard units. To be assessed as 'competent', against competency standards, individuals need to demonstrate they have achieved the requisite workplace functions and have also acquired the specified essential knowledge and associated skills (EKAS) underpinning performance.

A candidate wishing to be assessed against a specific competency standard unit(s) must be assessed by a qualified assessor. The assessor must use assessment processes, methods and tools which are in line with this Training Package.

Assessment involves gathering evidence to demonstrate that an individual has the necessary essential knowledge and associated skills required by the specified competency standard(s) together with requisite work performance. This may include assessment of knowledge and skills obtained through educational courses as well as through application of knowledge and skills in the workplace using workplace processes, equipment and activities.

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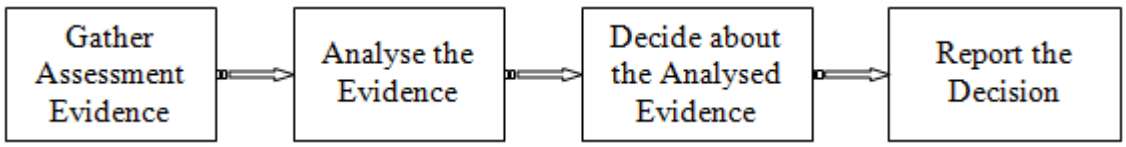
Assessment Planning

Good planning of workplace assessment is most important. The plan is to be based on a suitable process that is in line with the Competency Unit — TAAASS401A Plan and organise assessment from the Training and Assessment Training Package. Assessors need to address the following components of competence in Training Package TAA04, which cover:

- establishing evidence requirements for a specific context
- establishing suitable assessment methods
- developing assessment tools appropriate to a specific assessment context
- trialling assessment procedure.

The Assessment Process

The general process for assessing competence is shown in the following diagram.



Assessors need to adapt the process to take account of physical and operational conditions as well as the characteristics and background of the candidate being assessed. Once the process has been finalised, the candidate should be advised.

The Assessment Guidelines of this Training Package identify three assessment pathways for the Industry, as follows:

- Pathway 1: For new entrants to the industry
- Pathway 2: Recognition of prior learning of those with experience in the Industry
- Pathway 3: Recognition of equivalent Competency Standards Units from other Industry Training Packages

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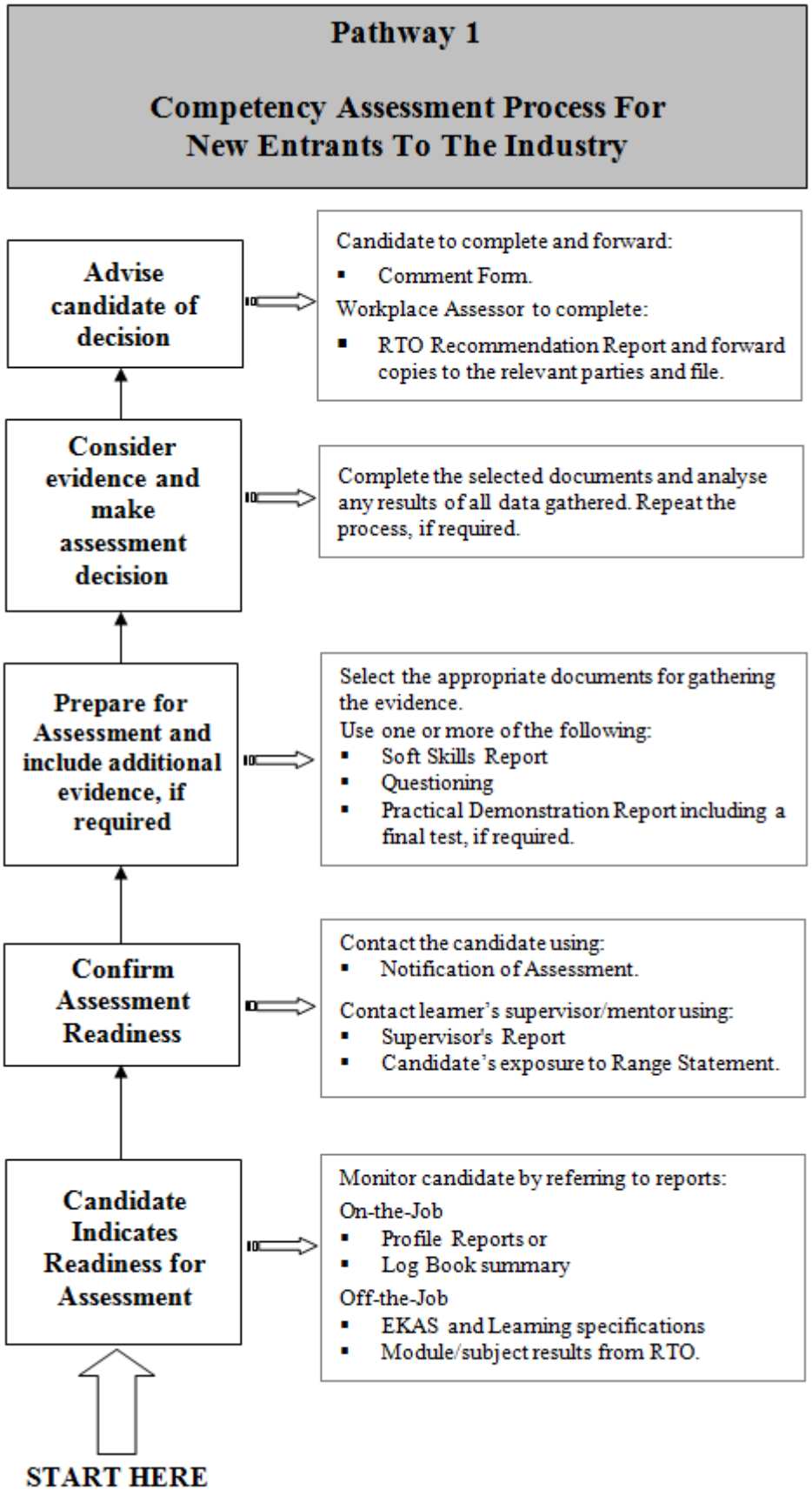
Pathway 3 can be incorporated within the Pathway 2 processes and activities.



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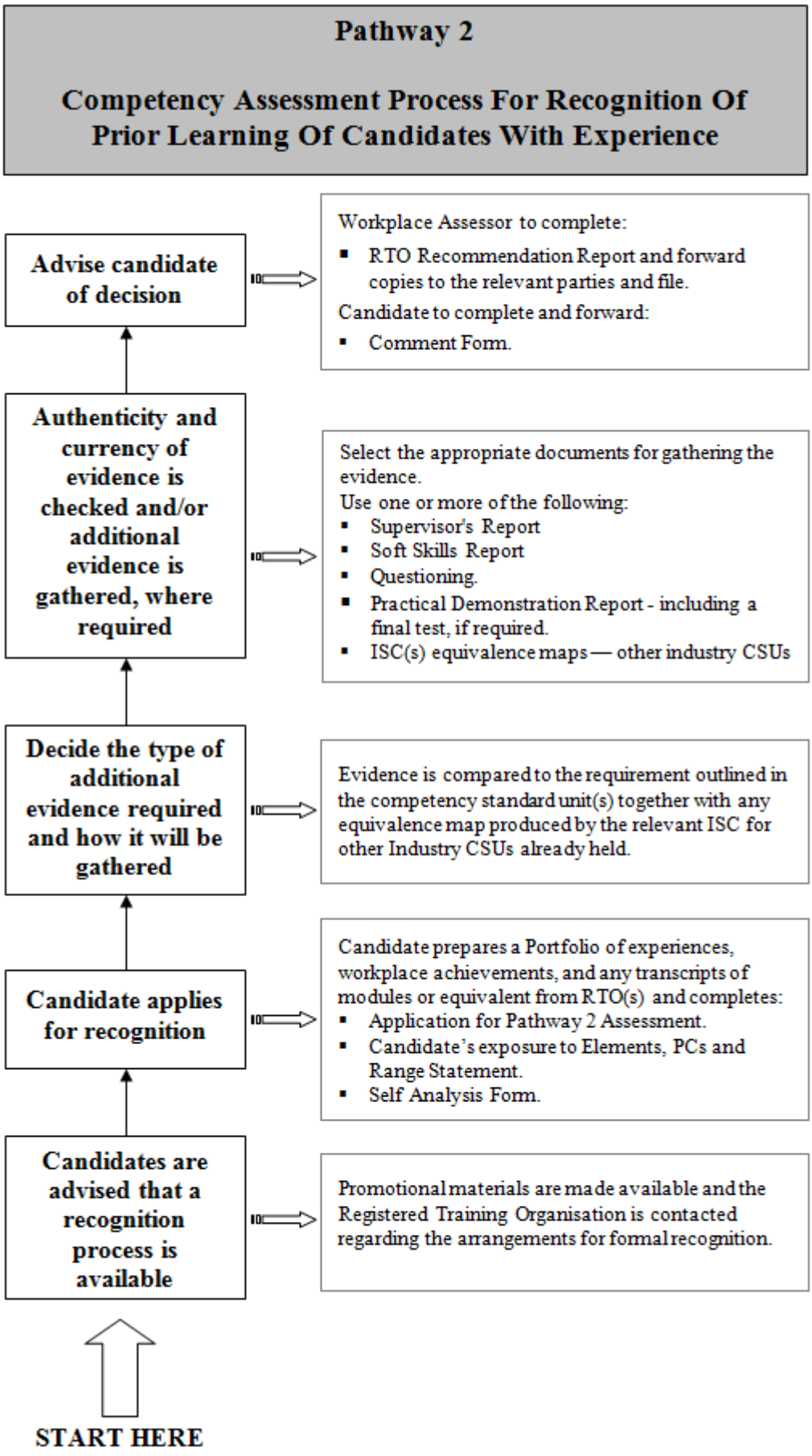

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Establishing the Evidence Requirements

The Training Packages provides a clear statement regarding the evidence requirements in the Evidence Guide and in particular the critical aspects of evidence of each competency standard unit. The following is an extract from one competency standard unit.

'***Critical aspects of evidence***

Before the critical aspects of evidence are considered all prerequisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated performance criteria shall be demonstrated on at least two occasions in accordance with the 'Assessment Guidelines – UEG06'. Evidence shall also comprise:

- A representative body of performance criteria demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the performance criteria and range
  - Apply sustainable energy principles and practices as specified in the performance criteria and range
  - Demonstrate an understanding of the essential knowledge and associated skills as described in Clause 6.1 'Essential knowledge and associated skills' of this unit to such an extent that the learner's performance outcome is reported on a percentile basis consistent with the preferred industry and/or regulatory benchmark requirements
  - Demonstrate an appropriate level of skills enabling employment
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Verify compliance and functionality of general electrical installations as listed in Clause '5. Range statement' and including:

    A — Selecting correct tools and testing equipment.
    B — Identifying visual non-compliance defects
    C — Using effective methods for conducting mandatory and optional tests
    D — Identifying non-compliance from test results.
    E — Identifying causes of non-compliance.
    F — Completing mandatory reporting.
    G — Dealing with unplanned events by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items'

The evidence on which competency in this unit is deemed shall be considered holistically. encompassing '**items'** of evidence that industry has deemed critical and that also relate directly to the Performance Criteria and Range Statements. These could include:

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- Specific tools, plant and equipment.
- Specific testing techniques
- Any advice limiting assessment to actual workplaces, for example because of licensing, regulatory or unique infrastructure requirements
- Specific licensing and regulatory requirements.
- Any advice dealing with unexpected and non-routine contingencies by drawing on essential knowledge and skills to provide appropriate solutions incorporated in a holistic assessment

Assessment Methods

Appendix B provides detailed information and examples of the methods and tools that may be used in the industry to help the assessment process.

Assessment involves determining whether a candidate has provided sufficient evidence to demonstrate that they have a specified level of skills and knowledge which they can apply in their work environment.

The evidence provided may include, for example:

- Work activity records
- a transcript of training outcomes
- a portfolio of learning experiences
- a self-assessment by the candidate against the relevant competency standard(s).
- supervisor's report(s), addressing requirements of the identified competency standard(s).
- practical demonstration.
- details of training undertaken linked to requirements of the identified competency standard(s), such as a profiling or 'many samples' reports
- outcomes of a challenge test.

The assessor may use a variety of assessment methods to gather evidence. Appropriate methods for documenting workplace experiences related to this Training Package are:

- on-the-job work observation
- practical exercises in the workplace or under simulated workplace conditions
- appraisal and report by a supervisor/trainer or colleague
- questioning and discussion with the candidate
- written/practical test
- any Industry Skills Council equivalence mapping declaration for competency standard units held from other Industry Training Packages

Develop the Assessment Tools

The assessment tools include:

- instruments for gathering evidence — samples included as Enclosure A in Appendix B
- forms for administrating the process — samples included as Enclosure B in Appendix B
- assessment design materials Glossary of Terms — included Enclosure C in Appendix B.

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Trial the Assessment Procedure

It is very important to trial the assessment strategy. There is a need to make sure it is appropriate to the context in which the assessment is conducted. This will involve such things as:

- Focus on the specific requirements of the competency standard unit being assessed.
- Consideration of the characteristics and background of the person being assessed to make sure the assessor supports the candidate in their understanding of the process and the skills and knowledge that need to be demonstrated.
- Use of assessment methods and instruments to make sure the evidence gathered:
  - - addresses the conditions required to meet the Critical Aspects of Evidence as outlined in this Training Package and related competency standard units
  - - is drawn from a variety of sources and reflects the required range of work circumstances
  - - provides reasonable certainty that the evidence submitted is sufficient, current and authentic.

The selection and application of assessment tools is a decision made by assessors. There is no standard answer, however the following is provided as general guidance.

- Assessors need only gather enough evidence so they can make a judgment that competence has been demonstrated. Too much evidence may be difficult to analyse in a consistent manner, whereas insufficient evidence fails to satisfy the assessment criteria.
- Assessors need to adjust or modify the assessment processes and tools as required, within the constraints of achieving a valid, reliable and fair outcome.
- Assessors need to make sure assessment procedures satisfy the principles of assessment (validity; reliability; flexibility; fairness).
- Assessors need to be cognisant and use the industry-preferred assessment approach, as a first option.
-

1.3.16 Appendix B - Enclosure A: List of Sample Assessment Instruments

Appendix B — Enclosure A: List of Sample Assessment instruments

Enclosure A1 Work activity records

Enclosure A2 Transcript of training outcomes

Enclosure A3 Portfolio

Enclosure A4 Self analysis

Enclosure A5 Candidates exposure to Range Statement

Enclosure A6 Supervisor’s report

Enclosure A7 Supporting skills report

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Enclosure A8 Questioning

Enclosure A9 Practical demonstration

Enclosure A10 Final/challenge test

Enclosure A11 Contracted entry level Profiling Model

Enclosure A1 — Work Activity Records

Work Activity Records may be produced in paper-based or in electronic form. Each Work Activity Record may relate to a group of Competency Standards or if need be a competency standard unit.

The activities and experiences recorded in this mode mostly relate to recurring workplace events associated with elements of performance involving exposure to a range of plant, tools, equipment, components and operating systems that are representative of normal work activities. Activities such as these, under appropriate levels of supervision, are important to a candidate's development.

Such records provide valuable data for:

- Candidates and their supervisor's to track progress in acquiring work-based competencies.
- Assessors to make decisions about a candidate's level of competence.

Work Activity Records summarise:

- relevant activities – (elements) and jobs/tasks undertaken at work
- associated resources used (such as tools, plant/equipment, procedures, and operating systems)
- the period of exposure to each type of task
- the level of supervision provided in the workplace.

This type of record is completed by the Candidate in conjunction with their Supervisor and signed by this Supervisor. It is important that workplace experiences are documented by candidates to help them see how their work experience is developing respective skills and knowledge specified in the relevant competency standard units. Assessors, as a result of the records, can easily analyse them to determine if:

- exposure to the desired workplace activities has occurred.
- the level of supervision is in keeping with the degree of autonomy required by the competency standard unit.
- The learner is able to perform 'whole of job' activities.

The ElectroComms and EnergyUtilities Industry Skills Council trading as EE-Oz Training Standards has a model paper based document that candidates can use to record their workplace activities and experiences. The document is called a User Guide. It is formatted in a way that links workplace activities to competency standard units.

More information, including User Guides and techniques for recording workplace experiences electronically are available from the EE-Oz Training Standards at website: www.ee-oz.com.au.

Enclosure A2 — Transcript of Training Outcomes

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Essential Knowledge and Associated Skills (EKAS) learning specifications and related results using training modules/topics/subjects that are completed off-the-job develop an individual's technical underpinning knowledge and skill. This may apply where the industry expects such due to the regulated or preferred nature of work.

These learning specifications provide the learner with the essential underpinning knowledge and associated skills required to:

- deal with both routine and non-routine technical activities
- readily adapt their skills when new technologies are introduced
- transfer skills to new work environments.

The Registered Training Organisation (RTO) who is issuing the credential can generally provide current information about an individual's progress in the essential knowledge and associated skills or mapped modules/topics/subjects.

Learners that have undertaken a recognised structured training program with an RTO should submit a formal transcript – 'Statement of Results' (training outcomes) from the issuing RTO as evidence, for inclusion in the process of competency assessment.

Candidates seeking recognition of prior learning need to provide evidence of knowledge and skills equivalent to the content of the essential knowledge and associated skills specifications (modules/topics/subjects) detailed in the competency standard units in which they are being assessed as well as their workplace experiences. Applicants for recognition of prior learning may also seek advice from the Registered Training Organisation about the equivalence status of available evidence of their acquired knowledge and skills.

The ElectroComms and EnergyUtilities Industry Skills Council trading as EE-Oz Training Standards at www.ee-oz.com.au can provide advice in regard to the availability of the essential knowledge and associated skills learning specifications for training modules/topics/subjects, which have been aligned to respective competency standard units and essential knowledge and associated skills clauses.

Enclosure A3 — Portfolio

A portfolio is a collection of documents that demonstrate an individual's professional experiences and achievements in relation to identified competency standards. Typically, portfolios include information from a variety of sources including academic achievements, employment record, work activities, supervisor reports and references.

The candidate should prepare their own portfolio as an accurate reflection of their work and academic history and achievements.

Assessors advise candidates about the amount, type and format of evidence they should submit for assessment against identified competency standard units.

The use of a Portfolio as an assessment instrument can be enhanced by the use of the Self-analysis form included as Enclosure A4.

Enclosure A4 — Self Analysis

A self-analysis involves the candidate in assessing their own level of skills and knowledge acquired through work experience and relevant training programs.

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Candidates should complete a Self-Analysis Form in relation to each competency standard being assessed, identifying the evidence they can provide to demonstrate each required component of their skills and knowledge.

Assessors can check the references to determine if the evidence provided links directly or indirectly to the requirements outlined in competency standard units and use this data as part of the overall assessment process.

Typically, the self-analysis form would be used for a Pathway 2 Assessment, however, it could have application in a Pathway 1 Assessment in certain circumstances.

Self-Analysis Application Form

This form allows candidates to summarise their vocational experiences in relation to a particular competency standard unit or a group of units. The information provided is used to identify the list of competencies sought for assessment. They will need to support their responses to questions, claims and/or comments with authentic evidence. To do this, it is recommended that they develop a portfolio of evidence to be submitted with this self-analysis application form. They should be advised to cross reference the information they provide with the information provided in their Portfolio.

They must however, be provided with clear instructions about the information required before they complete each respective form. They also need to view and understand the detailed requirements of the competency standard unit(s) against which they are seeking assessment. A workplace assessor should assist them with the instructions and details.

They may need to submit a separate Self-Analysis Form for each competency standard unit(s) for which they are seeking recognition. The Self-Analysis Application Form could be like the sample provided below.

Sample — Self-Analysis Application Form

Enter the codes and title of the National Qualification and title and codes the competency standard unit(s) from qualification for which you are seeking recognition.

Title of National Qualification	**Title and code of Competency Standard Unit(s)** **(For which recognition is being sought)**
	•
	•

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	•
	•
	•
	•
	•

Enter the codes and titles of Certificates, Qualifications, Transcripts of Academic achievement, or Licences that you believe to be supporting evidence.

(Remember to include these documents in your portfolio. You must be able to demonstrate how each document relates to the respective competency standards.)

Code and name of Certificate, Qualification, Transcript of academic record or Licence	Year Achieved

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Note: For all Certificates, Qualification and associated transcripts of academic records identified above, a certified copy must be provided.

- Approximately how many jobs have you been involved in that relates to each of the respective competency standard unit(s)?

  Competency Standard Unit 1 _____ Jobs

  Competency Standard Unit 2 _____ Jobs

  Competency Standard Unit 3 _____ Jobs

  Competency Standard Unit 4 _____ Jobs

  Competency Standard Unit 5 _____ Jobs

  Competency Standard Unit 6 _____ Jobs

  Competency Standard Unit 7 _____ Jobs

- Give details about the **largest** job you have been involved with. Briefly describe the job and where it was carried out. (Portfolio Ref _____)

- Estimate the total amount of time (for all similar job mentioned above of all size) you have been involved with — tick box. (Portfolio Ref _____)

	Less than 1 week	1 to 4 weeks	4 to 10 weeks	10 weeks to ½ year	More than ½ year
1					
2					
3					
4					
5					
6					
7					

- Describe the level of involvement you have had in this type of work — tick box. (Portfolio Ref _____)

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	Carrying out jobs organised by others	Carrying out jobs organised by others and completing all tests and/or writing of reports	Planning the job from the beginning, carrying out the work and completing all tests and writing of reports
1			
2			
3			
4			
5			
6			
7			

- To what extent were you involved in this type of work? — tick box.
(Portfolio Ref _____)

	Carrying out routine tasks	Carrying out and manage several routine tasks at one time	Deal with non routine tasks including diagnosing and rectifying faults	Organising others you work with and dealing with clients
1				
2				
3				
4				
5				
6				
7				

- How much training did you require to perform the work? — tick box.
(Portfolio Ref _____)

	Self taught	Basic technical	Analytical	People and

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	skills	knowledge and skills	technical knowledge and skills	customer skills
1				
2				
3				
4				
5				
6				
7				

- To what degree were you supervised when performing the work? — tick box.

	Constant supervision	General supervision	Self supervision
1			
2			
3			
4			
5			
6			
7			

- Describe any special features or circumstances about the type of work you have been involved with. (Portfolio Ref _____)

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- List as many different types of equipment items you used when you carried out the work associated with the competency standard units. Make the list under headings such as plant, tools, components, systems and the like. A workplace assessor can assist you with the headings. A separate form may be provided for supplying this information. (Portfolio Ref _____)

Unit code	Unit title	Items	

- For the competency standard units, have you completed a whole job using the equipment items listed above? Also indicate the number of times you have done so.

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CSU — 1	Involvement (circle yes or no)	Number of times		
	Planned the work	Yes	No	
	Carried out the work	Yes	No	
	Completed the work	Yes	No	

CSU — 2	Involvement (circle yes or no)	Number of times		
	Planned the work	Yes	No	
	Carried out the work	Yes	No	
	Completed the work	Yes	No	

CSU — 3	Involvement (circle yes or no)	Number of times		
	Planned the work	Yes	No	
	Carried out the work	Yes	No	
	Completed the work	Yes	No	

CSU — 4	Involvement (circle yes or no)		Number of times	
	Planned the work	Yes	No	
	Carried out the work	Yes	No	
	Completed the work	Yes	No	

CSU — 5	Involvement (circle yes or no)	Number of times		
	Planned the work	Yes	No	

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	Carried out the work	Yes	No	
	Completed the work	Yes	No	

CSU — 6	Involvement (circle yes or no)	Number of times		
	Planned the work	Yes	No	
	Carried out the work	Yes	No	
	Completed the work	Yes	No	

CSU — 7	Involvement (circle yes or no)	Number of times		
	Planned the work	Yes	No	
	Carried out the work	Yes	No	
	Completed the work	Yes	No	

Declaration by Candidate

All the information provided is entirely factual:

Name: ……

Signed ……..…. Date: …….

Enclosure A5 — Candidate Exposure to Range Statement

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This assessment instrument augments other information needed for judging competence and, where required, should be completed by the candidate to provide a list of components, tools, systems, plant, test equipment and associated items outlined in the Range Statement in individual competency standard units. As the Range Statement is a component part of the whole competency standard unit assessors should ensure the gathering of evidence by the candidate is considered a formative part of the assessment process and that, once the evidence is presented a holistic approach to judging and attributing competence is exercised in conjunction with other related data.

A separate form is required for each competency standard unit to be assessed. The assessor should complete the following parts of this form in conjunction with the candidate to make sure they are clear about what is required:

- Competency Standard Unit Title and Unit Number
- Candidate's Name
- Date
- Range Statement — Item Group:
  Consult the Range Statement as described in section *Establishing the evidence requirements* of this Document. Each group alpha character is to represent an appropriate group of variables, such as components, tools, system, plant, processes, equipment etc, as required by the particular competency standard.
- Range Statement — Items involved:
  List the particular items that have been predetermined as being critical from the critical aspects of evidence section when the evidence requirements were established (see *Establishing the evidence requirements*).

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Candidates place a tick in the column against those items they have been exposed to in a work environment. Candidate should add to the list of items involved, where appropriate. Here is an example.

Competency standard unit – _____ *(Assessor to complete this section)*		***Candidate to complete***
***Range Statement Item Group**	***Range Statement Items Involved**	**Identify the items you have worked on**
A Personal protective equipment	**Goggles**	4
	Gas mask	4
	Boots	
	Gloves	4
B Pipe types	**Cast Iron**	
	Plastic	4

Candidate's work experience with items in the Range Statement listed in this Competency Standard Unit

Competency standard unit title:		**Unit no:**
Candidate's name:		**Date:**
Range Statement Item Group	**Range Statement Items Involved**	***Candidate to complete*** **Identify the items you have worked on**
A		

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B		
C		
D		

Declaration by Candidate

All the information provided is entirely factual:

Name: ……

Signed ……..…. Date: …….

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Enclosure A6 — Supervisor's report

Typically, the 'supervisor' (mentor) approached to provide a report for competency assessment will have spent considerable time guiding or monitoring the candidate in his/her development by providing supervised workplace learning experiences, appropriate to the candidate's ability.

Supervisors should be asked to comment on the candidate's demonstrated ability to:

- demonstrate specific skills as described in the respective aspects of the competency standard units under assessment
- apply required essential underpinning knowledge and associated skills (eg. as learnt in their technical studies) to the work undertaken
- work in a team or independently in a way that is productive and safe.

Comments made by the candidate's supervisor/mentor are an important source of evidence for assessors.

The supervisor's report can be completed as part of the pre-assessment planning process or during any other part of the process. More than one supervisor can provide information.

Assessors should make sure supervisors are clear about the specific detailed requirements of the Gas Industry Competency Standards targeted for assessment.

Supervisor's Report on _____(Learner's Name)	
Name of Supervisor/Assessor: _____	**Date: ___/___/_____**
Position in organisation: _____Contact number:_____	
Approximate time (cumulative) providing guidance to the candidate _____days / hrs in Unit(s): _____ _____	
Responses made by supervisors/mentors are for the purpose of providing information to a workplace assessor. The supervisor is <u>not</u> making a decision about competence. The assessor will include the information with other data in the decision making process.	
Question asked of the supervisor/mentor	**Responses**

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Taking into consideration the candidate technical development and work experiences, can they:	**Yes**	**Requires further training**	**No**
Carry out duties with confidence			
Work in a safe manner with care for self and others			
Perform tasks with the minimal amount of waste or rework			
Complete tasks within a reasonable time			
Identify ways of improving how jobs are done			
Initiate action to improve processes or practices			
Work with others to achieve the work outputs of the group			
Work independently to achieve work outputs			
Resolve non-routine work functions			
Other comments:			
Supervisor's/Assessor's Signature: Date: / /			

Enclosure A7 — 'Supporting skills' report

Supporting skills refer to non-technical skills that candidates must demonstrate as part of their competency assessment. They include:

- the ability to work independently or in teams while dealing with customers
- knowledge of and ability to follow enterprise policies
- communication skills used in following and issuing instructions
- knowledge of and ability to address quality assurance requirements
- personal management and development skills

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- knowledge of and ability to address environmental protection and sustainable energy policies issues.

Candidates must demonstrate these important attributes which are embedded in all competency standard units in the Training Package.

A supporting skills report may be completed by an assessor, the candidate's supervisor or another third party. Following is a brief description of the various aspects of supporting skills.

Supporting Skills — What do they cover?

1. Enterprise Instructions

Technical manuals

Using enterprise or manufacturers' technical manuals to ensure equipment and parts are installed to manufacturer's specifications.

Quality systems

Plan, apply and contribute to quality systems.

Computers systems

Use enterprise documentation and record systems including, where appropriate, data capture equipment such as computers, information systems and technologies.

Environmental and sustainable energy requirements

The safe disposal of used oil, grease and chemicals and the reduction of electrical energy by turning of the lights and heating devices and the like to minimise the impact that engineering practices have on the environment.

Occupational Health and Safety (OHS) requirements

Follow OHS and standard operating procedures in a manner that is safe to the individual and others.

Equal opportunity/Ethical practice/Cultural diversity

Be familiar with the enterprise, equal employment opportunity polices, ethical practices and principles and awareness of cultural diversity.

Enterprise vehicles

Complete vehicle log book details accurately, ensure the vehicle is kept clean, secured and fuel and liquid levels are maintained.

2. Customer relations

Public

Provide courteous and informative advice during construction, maintenance or service activities.

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Workers providing other services

Cooperate with workers providing other construction, maintenance or service activities.

Clients and land owners

Recognise the responsibilities and rights of clients and land owners.

Authorities

Recognise the responsibilities and rights of statutory and other authorities.

3. Self development

Systematic problem solving

Solve problems by using technical literature, exploring theories, performing calculations and by making enquiries.

Personal wellbeing

Maintain and promote personal well being in the workplace through fitness and by avoiding excessive use of alcohol, tobacco and other substances.

Time management

Be punctual, complete work activities on time, and sequence activities to maximise the use of available time.

Professional development

Seek to improve technical ability by discussions with others or by technical research and on-going competency development.

4. Team work

Communications

Communicate plans, information, intentions and safety criteria to others' using appropriate means.

Team involvement

Contribute positively to the work-team environment.

Competency enhancement

Participate in the training of others by sharing ideas, explaining operating systems and detailing the working arrangements of components and equipment.

Instructions for completing the supporting skills report

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The supporting skills report on the next page provides a means of recording information about a candidate's skills. A workplace assessor (or nominee) does this by referring to documentation, asking the candidate questions and/or seeking advice from the candidate's supervisor/mentor.

Complete the form in the following way.

Step 1

Place a cross (X) in the box to indicate areas from where evidence has been sourced.

Supporting Skills Report		
Candidate's name		**Date**
Supervisor's/Assessor's name		/ /
Enterprise instructions 1. Applies correctly without constantly making reference to them. 2. Refers to them regularly and applies information correctly. 3. Awareness of their existence but not referred to or used.	**Rating** (1) 2 3	
Technical manuals	X	Identify a minimum of three.
Quality systems	X	
Computer systems	X	
Environmental requirements	X	

Step 2

Review documentation and/or ask questions of the learner or their mentor/ supervisor.

Step 3

For each area, establish the appropriate level (1, 2 or 3) that reflects the capability of the learner. Place a circle around the corresponding number. Evidence should be collected from a number of sources before rating the candidate.

Step 2

Review documentation and/or ask questions of the learner or their mentor/ supervisor.

Step 3

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For each area, establish the appropriate level (1, 2 or 3) that reflects the capability of the learner. Place a circle around the corresponding number. Evidence should be collected from a number of sources before rating the candidate.

Note: A rating of 2 or 3 indicates further training or experience is required. A rating of 1 indicates the candidate has demonstrated their competence in this area.

Supporting Skills Report		
Candidate's name		Date
Supervisor's/Assessor's name		/ /
Enterprise instructions 1. Applies correctly without constantly making reference to them. 2. Refers to them regularly and applies information correctly. 3. Awareness of their existence but not referred to or used.	***Rating (circle #)*** **1** **2** **3**	
Technical manuals		Identify a minimum of three.
Quality systems		
Computer systems		
Environmental and sustainable energy requirements		
Occupational Health and Safety requirements		
Equal Opportunity/Ethical practice/Cultural diversity		
Enterprise vehicles		
Customer relations 1. Customers are included in discussion effecting operational issues 2. Knowledge of but limited application of customer relations. 3. Requires more understanding of customer needs.	***Rating*** **1** **2** **3**	
Public		Identify a minimum
Workers providing other services		

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Clients and land owners		of two.
Authorities		
Self development 1. Desire to expand beyond the present job role. 2. Keeps abreast of new products and services. 3. Requires more understanding of the job role.	***Rating*** **1** **2** **3**	
Systematic problem solving		Identify a minimum of two.
Personal well being		
Time management		
Professional development		
Team Work 1. Shares ideas, assists and accepts assistance from others 2. Accepts ideas and assistance from others. 3. Prefers not to assist or accept assistance from others	***Rating*** **1** **2** **3**	
Communications		Identify a minimum of two.
Team involvement		
Competency enhancement		

Enclosure A8 — Questioning

It may be necessary as part of the assessment process, to gather additional evidence to clarify specific aspects of competence, especially in relation to the associated performance criteria. The RTO Assessor (or their nominee) may need to ask questions of the candidate, their supervisor or their trainer. A form is provided in this enclosure for documenting their responses.

The form provides guidelines for questioning a candidate about the Performance Criteria related to each element of competence. Typically, the elements in each of the competency standard units in this Training Package follow a similar structure. Principally they generally cover *planning for*, *carrying out* and *completing* the job function.

In this section of the document you will also find two tables which provide guidelines for assessing a candidate's response to these questions.

If the assessment is formative (as part of a training process) then the response given by the candidate should be consistent with the 'Appropriate coverage to questions -level 1'.

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If the assessment is summative (final) the responses should be consistent with the 'Appropriate coverage to questions - level 2'.

Note to assessors:

1. As competency standard units are typically structured around PLAN ⇐ CARRY OUT ⇐ COMPLETE jobs in the workplace, the form for recording responses is generic.

2. Please make reasonable adjustments to the form as required to accommodate particular aspects of individual competency standard units.

Level 1 — Appropriate coverage of responses to questions

Element 1 – Planning for job/task functions (L1)

Issues about involvement of personnel, enterprises operational requirements and the requirements of regulators would not normally be expected.

Coverage should involve such things as:

OHS:

- Clarifying instructions given if any doubt exists as to what is required
- Checking with others involved if any personal protective equipment is needed
- Identifying hazards and risks associated with the wok, including any first aid and other similar requirements

Tools, equipment etc:

- Identifying the tools and equipment that are required
- Explaining where any special equipment is located and how arrangements will be made to have them available, if required.

The work schedule:

- Identifying the work and relevant processes, procedures and personnel required
- Identifying the process of work to be undertaken
- Identifying the work site activities and issues to be attended to
- Identifying the authorities associated with the work.
- Identifying any isolation procedures/permits that may apply.

Element 2 – Carrying out job/task functions (L1)

Coverage should involve such things as:

OHS:

- Keeping the immediate work area clear of debris
- Keeping tools clean and organised when not in use
- Keeping clear of such things as moving parts, live electrical conductors, hazards, and obstacles

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- Wearing work clothes and personal protective equipment when required
- Performing the technical work required
- Applying the relevant knowledge and skills underpinning performance.

Tasks:

- Following instructions given by others
- Observing what is occurring, listening to explanations about why tasks are performed in certain ways and asking questions when required.

Element 3 – Completing job/task functions (L1)
Coverage should involve such things as: • Cleaning tools and equipment • Returning tools and equipment to their normal storage place.

Level 2 — Appropriate coverage of responses to questions

Element 1 – Planning for job/task functions (L2)
Coverage should involve, but not limited to, such things as: **OHS:** • Clarifying instructions given if any doubt exists as to what is required • Arranging for any special personal protective equipment to be available • Checking to see if the work site is accessible. **Personnel:** • Identifying other personnel involved in the work and coordinating proposed activities. **Regulatory requirements:** • Arranging for relevant work instructions and installation specifications to be available, if required • Arranging work permits/isolation, etc. **Tools, equipment etc:** • Arranging the tools and equipment that are required • Coordinating where any special equipment is located and how arrangements will be made to have them available, if required. **The work schedule:** • Confirming the plan and process of work to be undertaken • Confirming the work and relevant processes, procedures and personnel required

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Element 1 – Planning for job/task functions (L2)
• Confirming the work site activities and issues to be attended to • Confirming the authorities associated with the work • Confirming isolation or work permits authorities.

Element 2 – Carrying out job/task functions (L2)
Coverage should involve, but not limited to, such things as: **OHS:** • Keeping the immediate work area clear of debris • Keeping tools clean and organised when not in use • Keeping clear of such things as moving parts, live electrical conductors and obstacles • Wearing work clothes and personal protective equipment when required • Having barriers in place to exclude public access to the work place, as required • Ensuring all personnel involved are alerted to work activities and communications are established and maintained • Keeping alert to the working environment while watching for unexpected occurrences • Confirming appropriate competence of first aid and persons, including other requirements such as confined space and the like, where appropriate. **Engineering tasks — specific actions should be included that are additional to the following:** • Performing tasks independently with reference to enterprise instructions • Accept and act on initial advice and feedback provided by others • Observing what is occurring, listening to explanations about why tasks are performed in certain ways and asking questions when required • Applying essential knowledge and associated skills and providing solutions to 'what if' scenarios. **Technical assistance:** • Further reference to enterprise instructions • Reference to the requirements of regulations, work instructions or other relevant standard • Recall of theory or application • Involvement of others with greater experience.

Element 3 – Completing job/task functions (L2)
Coverage should involve, but not limited to, such things as:

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Element 3 – Completing job/task functions (L2)
Performance checks: • Checking that all guards & covers removed during the activities are replaced and adjusted • Check that all temporary arrangements required during the process work have been removed • Carrying out any tests required by regulation or work instructions • Operating the installed/repaired parts or system to ensure it functions as specified. **Notification:** • Informing all immediate personnel involved that the work is completed • Informing clients and others that the work is completed • Removing all signs and barriers, as necessary • Reporting any damaged tools and equipment and arrange replacement. **Paperwork:** • Completing store/inventory paperwork • Completing the work log or management reports precisely by recording what occurred and providing recommendations/solutions to be followed up in point form.

Instruction for recording responses to questions

Step 1

Identify the elements of competence on which questions will be asked.

Step 2

Identify if the response expected is to be typical of a candidate who is undergoing a formative assessment (level 1) or summative assessment (level 2). This may be different for each element involved.

Step 3

Ask the main question and indicate (Y or N) whether the candidate's response addresses the coverage required.

Step 4

Ask follow up questions to probe any areas not recorded as Y in Step 3. Record Y or N to the response given in the space provided.

From all the evidence presented a holistic judgement is then made.

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Questions

Unit Title: **No.**						
Candidate's name: **Assessors name:**						
Main Question for the '*Planning Work*' Element **What are the main things you would consider when planning and preparing for work?**	**Expected Response Level**				**Not used**	
	(circle)	**1**	**2**		**(tick)**	
Issues to be cover in response to the main question – and – follow up questions, if required					**Coverage (Y or N)**	
What OHS issues do you consider?						
Who are the personnel you would involve?						
What enterprise requirements need to be taken into account?						
What regulatory requirements need to be taken into account?						
What tools, equipment and other items need to be arranged to do this job, where will you get them from and how will you arrange to have them made available when you need them?						
What work schedule will be followed?						
Main Question for the '*Carry-Out Work*' Element **What are the main things you will do to ensure the work you carry out is done productively?**	**Expected Response Level**				**Not used**	
	(circle)	**1**	**2**		**(tick)**	
Issues to be cover in response to the main question – and — follow up questions, if required					**Coverage (Y or N)**	
What are the main OHS practices and precautions that are specific to						

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Unit Title: **No.**	
Candidate's name: **Assessors name:**	
this work function?	
What are the main engineering tasks involved in this job?	
What would you do if the work you were undertaking became technically difficult and you could not complete it to requirements?	
What essential knowledge and associated skills would support a response to providing solutions to 'what if' scenarios?	

Unit Title: (Cont.) **No.**						
Candidate's name: **Assessors name:**						
Main Question for the '*Completing Work*' Element	**Expected Response Level**				**Not used**	
What are the main things you will do? What needs to be done to finalise the job?	**(circle)**	**1**	**2**		**(tick)**	

Issues to be cover in response to the main question – and – follow up questions, if required	**Coverage (Y or N)**
What checks need to be made to insure the work you undertook meets specified performance requirements?	
Who do you notify that the work has been completed?	
What paperwork needs to be completed and what will you write about?	

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Enclosure A9 — Practical Demonstration

As part of evidence provided to demonstrate competence against detailed competency standards, the assessor may need to observe the candidate demonstrating practical tasks.

The Engineering Practical Skills Form is provided herein to help assessors record these work-based observations. The notes taken are analysed and from this a rating is given about the candidate's engineering skills.

Note to assessors:

- The form for recording responses is generic to all competency standard units.
- Make reasonable adjustments to the form as required to accommodate particular aspects of individual competency standard units.
- You may only need to observe candidates on particular (not all) Elements of Competence.
- If the assessment is formative (for feedback purposes), then the level of supervision that applies during work activities should apply during the assessment activity.

Instructions for completing the Engineering Practical Skills Form

The form provides a means of recording information about a learner's engineering practice. A workplace assessor (or nominee) does this by an observation of pre-arranged activities and determining an engineering skills rating.

Step 1

Enter the title of the competency standard unit and its Unit Number in the space provided.

Step 2

Enter the learner's name in the space provided.

Step 3

Enter the name of the person who is completing the form (this may be the assessor or someone who the assessor nominates to gather the information).

Step 4

Enter the date on which the evidence is gathered.

Step 5

Determine the elements of competence being observed (circle yes or no).

Step 6

Determine the level of supervision that is to apply to the elements being observed. Use the supervision — Level code from the bottom left of the form (A, B or C) and enter in the second column.

Step 7

Observe the learner perform tasks related to the element(s) being assessed, checking that they address the required Performance Criteria. Record in the first column of the table under the heading 'Notes from Observation' key points to indicate whether the learner:

- Has acted in a way that meets specifications required by manufacturers, regulations or client specifications

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- Has followed established enterprise procedures
- Met the requirements of the Competency Standard being assessed
- Needed to be shown or told how to perform tasks beyond what is reasonably expected given his/her level of experience and therefore requires further training.

Step 8

Using the engineering skills rating codes at the bottom right of the table, enter the appropriate letter in the space provided to indicate the level of competence demonstrated in relation to the competency standard being assessed.

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From all the evidence presented a holistic judgement is then made.

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Engineering practical skills form

Competency standard unit title: _____ **Date:** _____/_____/_____

Candidate's name: _____ *Assessor's Name:* _____

Notes from observation	Supervision Enter A, B or C	Engineering Practice Enter D, E, F, G
Plan activities: Yes or No (circle to indicate if evidence is being gathered)		
Carry out activities: Yes or No (circle to indicate if evidence is being gathered)		
Complete activities: Yes or No (circle to indicate if evidence is being gathered)		

Supervision Level		Engineering Skills Rating	
A	The learner is working under direct supervision.	D	Met required specifications.
B	The learner is working under limited supervision	E	Followed established enterprise procedures.
C	The learner is working under general supervision with a high degree of autonomy	F	Met competency standard requirements
		G	Further training required

Learner's Signature ……

Assessor's Signature ……

Enclosure A10 — Final/Challenge Test

A test may be required if the assessment process does not provide:

- sufficient, authentic or current evidence
- particular aspects of evidence related to equipment operation
- particular aspects related to safety
- all the requirements related to the influence of external bodies such as regulatory authorities.

A final test should:

- cover the conditions associated with the 'Critical Aspects of Evidence' statement in competency standard units
- take into account the principles of assessment and be sufficiently rigorous
- be consistent with the policies and practices of the Registered Training Organisation who is providing the recognition.

Enclosure A11 — Contracted Entry Level Profiling Model

In relation to the industry-preferred assessment model for contract entry-level competency development programs (New Apprenticeships), longitudinal approaches to assessment activities are considered more efficient and effective. This is best achieved by implementing a process where the learner frequently gathers reliable data from the workplace has it verified in a form that can be easily used and consistently interpreted.

One option is to use a machine-readable data scan card or direct web entry process, operating in conjunction with a sophisticated computer software program to achieve this result. The design of the system known as Profiling reflects the key requirements outlined in the relevant competency standard units making up the competency development plan/program. Learners report directly on their exposure to required work experiences in a structured way. Additional to the off-the-job technical training required for contracted entry level learners Profiling gathers specific workplace information reliably and systematically.

Data gathered frequently from the workplace accumulates over the competency development period and is reported graphically at given periods. This approach encourages self review and participation in the system and eliminates bias and minimises the effects of low levels of literacy (see over the page for an example).

The information gathered under Profiling, forms one component of a two part, in some cases three part, Training Program that supports competency development in a way preferred by the industry. The components are:

off-the-job training (technical subjects/topics), and

on-the-job training (workplace activities), and

a specific final 'safety systems (capstone)' test, where applicable.

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Typically the off-the-job component requires the successful completion of technical subjects/topics of training against essential knowledge and associated skills (EKAS) clauses included in the respective competency standard units. More often than not the EKAS are aligned to EKAS learning specifications that expand on the essential knowledge and associated skills clauses; providing more detailed information on depth and breadth of learning required, for RTOs. The on-the-job component requires a profile to develop from workplace experiences/exposures. Finally, a specific safety assessment test is conducted, where applicable, for regulatory and industry requirements.

In relation to the on-the-job workplace data (experiences/exposures) is gathered and reported on against the respective aspects of industry determined competency standards, using predefined industry norms. Typically the information gathered pertains to the:

- activity against each element of competency and indirect information against the performance criteria
- quality, breadth and range of equipment, processes, techniques and applications experienced and worked with/on in the workplace
- level of supervision of a learner's workplace experiences
- hours of exposure (recording hours only is not generally considered Profiling).

Entry against the prescribed criteria is completed regularly (eg weekly) by the learner, the software program calculates the data against industry predefined norms and regular reports are produced (typically quarterly) for the use and information of RTOs, employers and the learner. Assessors use this information in a holistic way to identify and analyse trends and anomalies against the predefined industry norms.

The advantage of Profiling over many other mediums such as manually based log-books which require extensive and laborious analysis is that it is simple and directly reflective of the workplace experiences undertaken at the time. It provides evidence for:

- managing workplace skill development/ performance of competency required to produce quality work
- progressive assessment and supporting the attainment of a national qualification
- the attainment of an electrical workers' licence/regulated registrations, where appropriate
- the need for job rotation
- allocating work
- RTOs — thus reducing the demand for an array of workplace assessors.

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To gain an appreciation of what a data card and a report may look like a sample of each is included below.

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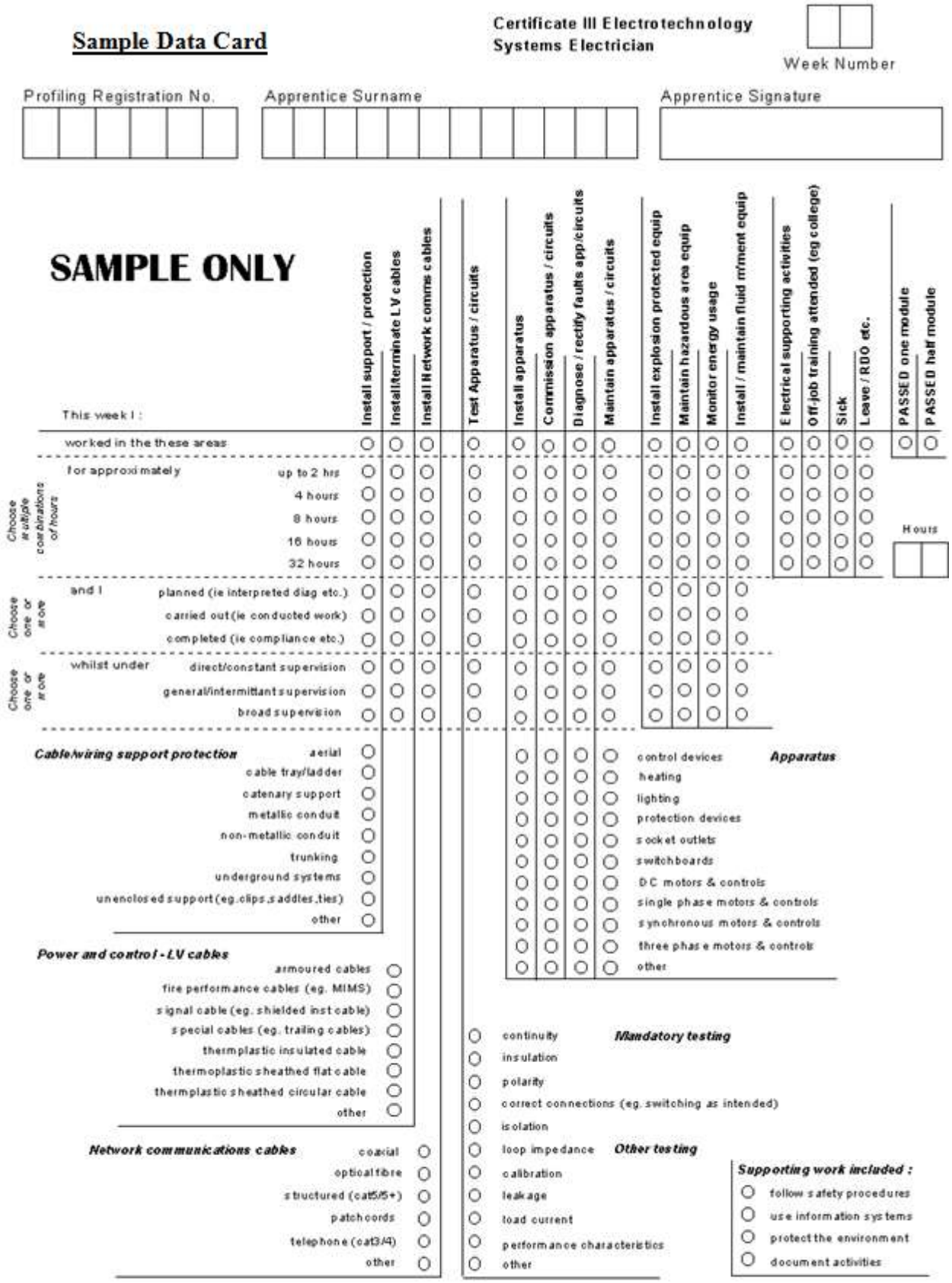

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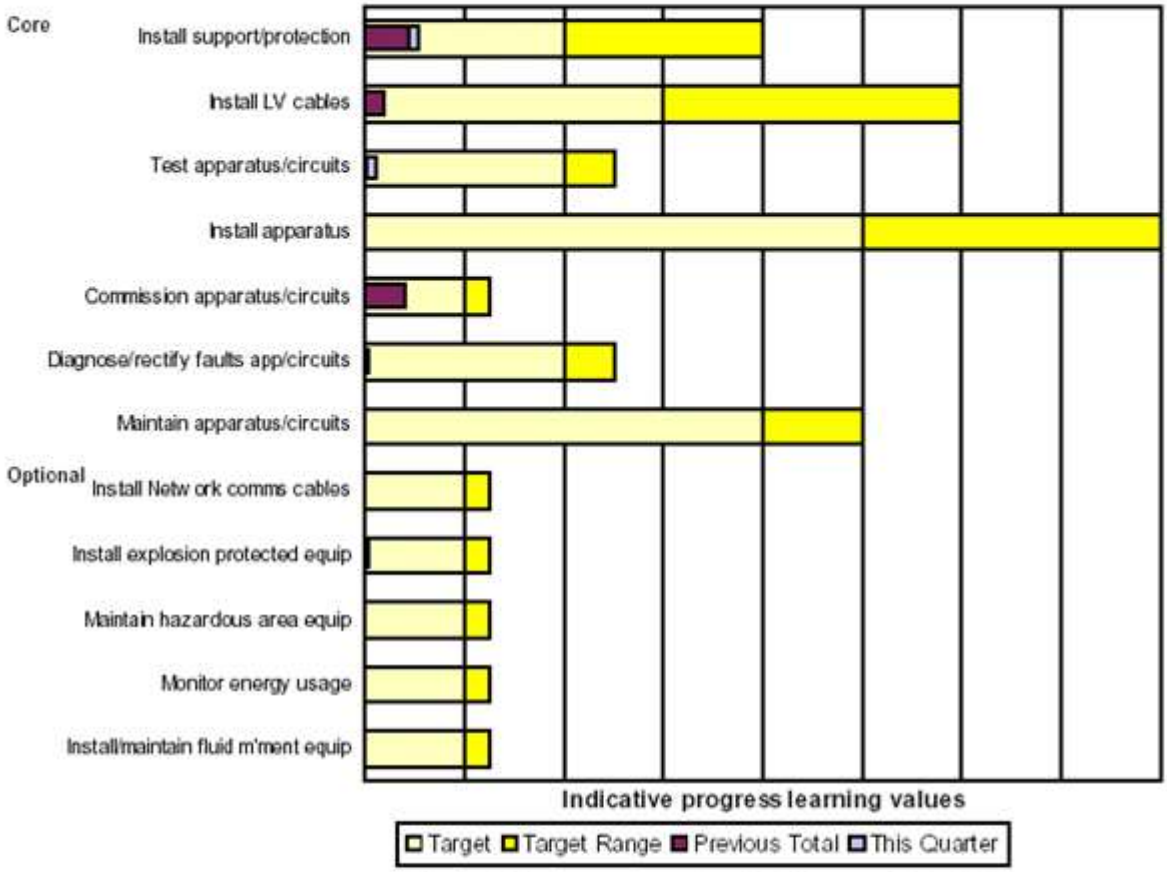
Sample Profiling Report

First Zzsample (999999)

Apprentice On Job Experience Profile - Progressive and Benchmarks Points

Systems Electrician - Quarterly Report, May 2002



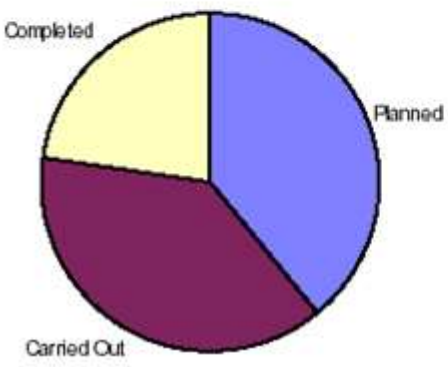
* indicates Optional competency selected by the learner in Schedule C

Apprentice Signature ..... Date .....

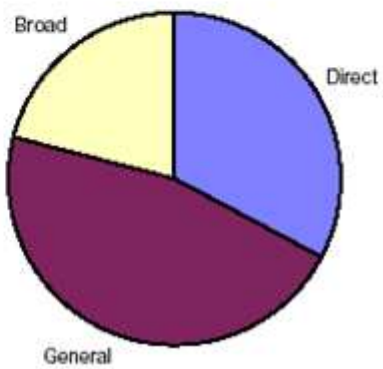
Employer Signature ..... Date .....

Host Signature (if applicable) ..... Date .....

Apprentice role



Supervision level



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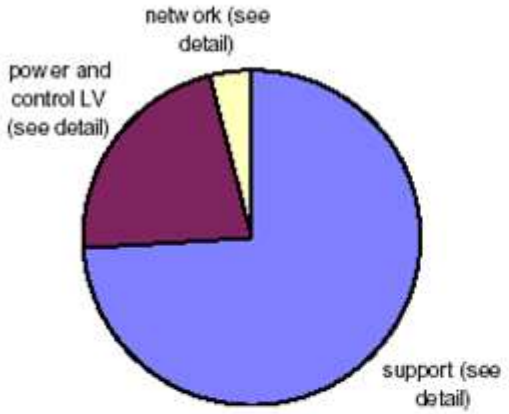
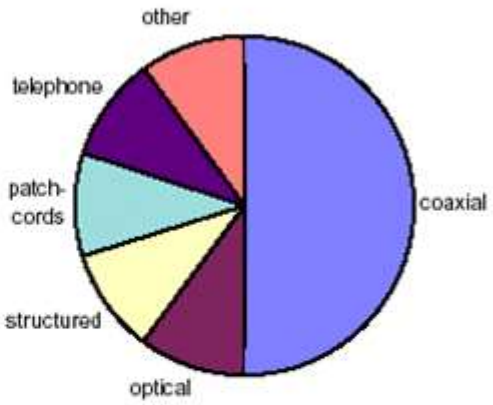
Sample Profiling Report (cont.)

First Zzsample (999999)

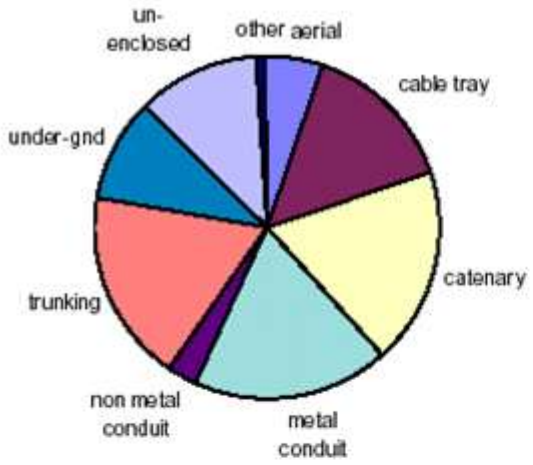
Electrical wiring system type



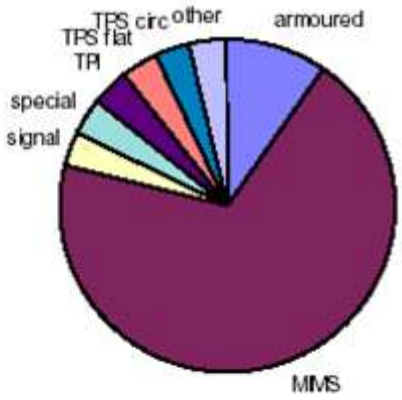
Electrical wiring detail: Network communications



Electrical wiring detail: Support and protection



Electrical wiring detail: Power & control - LV



Testing techniques used

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1.3.17 Appendix B - Enclosure B: Administrative Forms

Appendix B — Enclosure B: Administrative Forms

Enclosure B1	**Notification of Workplace Assessment**
Enclosure B2	**Application for Recognition of Prior Learning/ Current Competence**
Enclosure B3	**Assessee Comment/Feedback**
Enclosure B4	**Candidates Competency Achievement Report to a RTO**

Enclosure B1 — Notification of Workplace Assessment

This form is used to notify a learner about their assessment. The learner is advised of the type of evidence being sought, the competency standard unit(s) of competence being considered, who will be involved and the time and place of the activity.

Enclosure B2 — Application for Recognition of Prior Learning/ Current Competence

Candidates should use this form to apply for recognition. The applicant needs to provide their personal details, the competency standard unit(s) for which they seek recognition, the type of evidence being provided and the names of referees.

Enclosure B3 — Assessee Comment/Feedback

This form is used by the learner (or RPL applicant) to make comments about the workplace assessment process and/or decision. It should be distributed prior to an assessment event being conducted. The workplace assessor should be sent a copy of each form completed and should retain completed forms in case of any future review and/or inquiry.

Enclosure B4 — Candidate's Competency Achievement Report to an RTO

This form summaries a workplace assessment process and allows workplace assessors to make recommendations to an RTO about deeming competence of a learner or RPL applicant.

Enclosure B1 — Notification of a Workplace Assessment

Learner's Name: _____ **Date of notification:** / /

Assessor's Name: _____Tel: _____

Qualification Title: _____

The workplace assessment will be carried out on the	**For the following reason**

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following Competency Standard Units		**(tick)**	
Unit No.	**Unit Title**	**Advice**	**Completion**

Location _____ Date: / / Time: _____

Information has already been gathered from or is to be gathered from the following sources indicated below.

No	**Source of Information**		**Already Gathered (tick)**	**To be Gathered (tick**
1	**Work Activity Records** — experiences mostly relate to re-occurring workplace events.	Paper Based		
		Electronic		
2	**Technical Results** (i.e. modules) — part of the program that develops your technical knowledge and skill			
3	**Portfolio** — personal and academic detail, employment and work achievements, references and the like			
4	**Self Analysis** – provides guidance on the type of evidence required and guides reference to other information			
5	**Item Range** — list of components, tools, systems, plant, test equipment, etc on which experience is gained			
6	**Supervisor's Report** — general comments about applying technical skills, being safe and productive			
7	**Soft Skills Report** — your ability to follow instructions, deal with clients and work in teams			
8	**Questioning** — covers issues related to your performance when planning, carrying out and completing work			

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9	**Practical Demonstration** — a demonstration of your ability to perform tasks in a actual or simulated situation		
10	**Final Test** – evidence related to critical aspects of what is required by you to demonstrate competence		
11	**Other** (list)		

Note: Once all the information is collected and the data analysed the results about your progress towards or achievement of competence will be forwarded to you for your comments. If you require any additional information you should contact the assessor (above telephone number) or your nominated supervisor/mentor.

Name_____ **Signature** _____

Enclosure B2 — Application for Recognition of Prior Learning/ Current Competence

Name: _____ Date of Birth: / /

Address: _____

Telephone: _____Mobile _____e-mail_____

Recognition Sought _____

Training Package _____

Qualification No. and Title _____

Competency Standard Units (Candidate to List)

Unit Title	**Unit No.**

Evidence Provided

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Type	**Tick if Attached**
Certificates	
Curriculum Vitae	
Transcript of Academic Record – modules completed/equivalent	
References	
(other)	

Referees

Name	**Organisation and Title of Referees**	**Contact Number of Referees**

Candidate's Signature: _____ Date: / /

Enclosure B3 — Assessee Comment/Feedback

To be completed by the candidate following an assessment event.

Location: _____Date: ____/____/____Time: _____

Assessor's Name: _____

Please complete the following and return it to the Assessor.

Candidates' Name: _____

Contact N°: _____

I have read the Final Report for this assessment event and,

(**tick**)

Agree with the outcome

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or

Disagree with the outcome

Comments:

_____

_____

_____

_____

_____

_____

_____

Candidate's Signature: _____ **Date:** _____/_____/_____

Enclosure B4 — Candidate's Competency Achievement Report to RTO

This recommendation is made to (enter RTO name) _____

It is recommended that (learner's name) _____ (contact and identification details) _____
_____ be attributed competence in the following Competency Standard Units.

These units are from the Qualification (Title and No.)

_____

Unit No.	**Competency Standard Unit Title**	**Assessor's initials**

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The recommendation was made based on analysed evidence taken from the following sources	**Tick**
Work Activity Records	
Module (Learning Specification) Results	
Portfolio	
Self Analysis	
Item Range – Learner's Report	
Supervisor's Report	
Soft Skills Report	
Questioning	
Practical Demonstration	
Final Test	
Other (enter)	

Statement

The recommendation to attribute competence to the above-mentioned individual is based on the evidence requirements outlined in competency standard units from the _____ (Enter the Number and Title of the Training Package.)

Assessor's Name _____

Signature _____ **Date:** / /

1.3.18 Appendix B - Enclosure C: Glossary of Terms

Appendix B — Enclosure C: Glossary of Terms

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Definitions of all terms used in assessment design materials are below.

Term	Definition/Explanation
Appeal process	A process whereby the person being assessed or other interested party, such as an employer, may dispute the outcome of an assessment and seek reassessment.
Assessment	The process of collecting evidence and making judgements on whether competency has been achieved to confirm that an individual can perform to the standard expected in the workplace as expressed in the relevant endorsed industry/enterprise competency standards or outcomes of accredited courses.
Assessment context	The environment in which the assessment will be carried out. This will include physical and operational factors, the assessment system within which assessment is carried out, opportunities for gathering evidence in a number of situations, the purpose of the assessment, who carries out the assessment and the period of time during which it takes place.
Assessment guidelines	Assessment guidelines are the endorsed component of a Training Package which underpins assessment and which sets out the industry approach to valid, reliable, flexible and fair assessment. Assessment guidelines include the assessment system overview, assessor requirements, designing assessment resources, conducting assessment and sources of information on assessment.
Assessment judgement	Assessment judgement involves the assessor evaluating whether the evidence gathered is valid and authentic, and whether there is sufficient and reliable evidence to make the assessment decision. The assessment judgement will involve the assessor in using professional judgement in evaluating the evidence available.
Assessment materials	Assessment materials are any resources that assist in any part of the assessment process. They may include information for the candidate, assessment tools or resources for the quality assurance arrangements of the assessment system.

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Term	Definition/Explanation
Assessment plan	An assessment plan is a document developed by an assessor that includes the elements and competency standard units to be assessed, when the assessment will occur, how the assessment will occur, the assessment methods to be used and the criteria for the assessment decision.
Assessment process	The assessment process is the agreed series of steps that the candidate undertakes within the enrolment, assessment, recording and reporting cycle. The process must suit the needs of all stakeholders and be both efficient and cost-effective. The agreed assessment process is often expressed as a flow chart.
Assessment strategy	Assessment strategy means the approach to assessment and evidence gathering used by the assessor or RTO. It encompasses the assessment process, methods and assessment tools.
Assessment system	An assessment system is a controlled and ordered process designed to ensure that assessment decisions made in relation to many individuals, by many assessors, in many situations are consistent, fair, valid and reliable.
Assessment tool	An assessment tool contains both the instrument and the instructions for gathering and interpreting evidence: • Instrument[s] — the specific questions or activity developed from the selected assessment method[s] to be used for the assessment. A profile of acceptable performance and the decision making rules for the assessor may also be included. • Procedures — the information/instructions given to the candidate and/or the assessor regarding conditions under which the assessment should be conducted and recorded.
Candidate	A candidate is any person presenting for assessment. The candidate may be: • a learner undertaking training in an institutional setting • a learner/worker undertaking training in a workplace • an experienced worker wanting their skills recognised • any combination of the above.

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Term	Definition/Explanation
Competency	The specification of knowledge and skill and the application of that knowledge and skill to the standards of performance required in the workplace.
Competency standard	Competency standards define the competencies required for effective performance in the workplace. Standards are expressed in outcome terms and have a standard format comprising of Unit title, Unit descriptor, Elements of Competency, Performance Criteria, Range Statement and Evidence Guide. See also *Unit[s] of Competency*.
Competency standard unit	Also see Unit of Competency
Critical aspects of competency	A statement in a Unit of Competency that provides clear meaning as to what is to be achieved in the assessment process.
Currency of evidence	Evidence that is relevant to what is outlined in competency units and not outdated or irrelevant.
Dimensions of competency	The concept of competency includes all aspects of work performance and not only narrow task skills. The four components of competency are: • task skills • task management skills • contingency management skills • job/role environment skills.
Electronic Profiling	An innovative electronic based logbook system used by apprentices to record, and report on their workplace activities. A specially designed data entry card is used to capture work experiences (eg weekly) against industry approved competency standards and reported against industry-defined benchmarks. *See* Section 3.5 Assessment Processes within the Electrotechnology Industry and section Appendix B — Enclosure A11 Contracted entry level Profiling Model.

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Term	Definition/Explanation
Element of Competency	The basic building block of the competency standard unit. Elements describe the tasks that make up the broader function or job described by the unit.
Essential Knowledge and Associated Skills clauses	EKAS clauses provide the content specifications that must be achieved by learners in terms of the body of essential knowledge and associated skills.
Essential Knowledge and Associated Skills learning specification	EKAS learning specification is specific learning content that is complete in itself and expands on the competency standard units EKAS clauses in terms of depth and breath. It may underpin many, few or one competency standard unit(s). It covers one or more aspects of knowledge and skills. An EKAS LS can be separately delivered and assessed with percentage achievement reporting, and may be linked with other EKAS LSs for delivery purposes in the same discipline area.
Evidence/ quality evidence	Evidence is information gathered which, when matched against the performance criteria, provides proof of competency. Evidence can take many forms and be gathered from a number of sources. Assessors often categorise evidence in different ways for example: • direct, indirect and supplementary sources of evidence • evidence collected by the candidate or evidence collected by the assessor • historical and recent evidence collected by the candidate and current evidence collected by the assessor. Quality evidence is valid, authentic, sufficient and current. It enables the assessor to make the assessment judgement.
Evidence gathering techniques	Evidence gathering technique means the particular technique or method used to gather different types of evidence. This may include methods or techniques such as questioning, observation, third party reports, interviews, simulations and portfolios.
Evidence Guide	Evidence Guide is part of a competency standard unit. Its purpose is to guide assessment of the unit in the workplace and/or a training

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Term	Definition/Explanation
	environment. The Evidence Guide specifies the context of assessment, the critical aspects of evidence and the required or underpinning knowledge and skills. The Evidence Guide relates directly to the Performance Criteria and Range Statement defined in the competency standard unit.
Fairness	See section 3.4 Assessment Principles
Flexibility	See section 3.4 Assessment Principles
Holistic/ integrated assessment	An approach to assessment that covers the clustering of multiple units/elements from relevant competency standards. This approach focuses on the assessment of a 'whole of job' role or function that draws on a number of units/elements of competence. This assessment approach also integrates the assessment of the application of knowledge, technical skills, problem solving and demonstration of attitudes and ethics.
Industry Skills Council/Industry Training Advisory Bodies (ITABs)	National bodies comprising representation from the industry parties responsible for the development, review, implementation, and providing advice on qualifications scopes and competency standards in given industries.
Module	A specific learning segment that is complete in itself. It deals with one or more aspects of knowledge and skills. A module is separately delivered and assessed and may be linked with other modules in the same study area and aligned to a competency standard unit(s).
New Apprenticeship Centre	An organisation who provides information on apprenticeships, traineeships and the related qualifications and processes.
Portfolio	See section 3.5 Assessment Processes in the Electrotechnology Industry.

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Term	Definition/Explanation
Profiling	See section 3.5 Assessment Processes in the Electrotechnology Industry.
Performance Criteria	Evaluative statements which specify what is to be assessed and the required level of performance. The Performance Criteria specify the activities, skills, knowledge and understanding that provides evidence of competent performance for each Element Of Competency.
Qualification	Qualification means, in the vocational education and training sector, the formal certification, issued by a Registered Training Organisation under the Australian Qualifications Framework, that a person has achieved all the requirements for a qualification as specified in an endorsed Training Package or in an Australian Qualifications Framework accredited course where no relevant Training Package exists.
Range Statement	Part of a competency standard, which sets out a range of contexts in which performance can take place. The range helps the assessor to identify the specific industry or enterprise application of the competency standard unit.
Reasonable adjustment	The nature and range of adjustment to an assessment tool or assessment method which will ensure valid and reliable assessment decisions but also meet the characteristics and background of the person(s) being assessed.
Recognition **[Recognition of Prior Learning, Recognition of Current Competency and Skills Recognition]**	Recognition is a term that covers Recognition of Prior Learning, Recognition of Current Competency and Skills Recognition. All terms refer to recognition of competencies currently held, regardless of how, when or where the learning occurred. Under the Australian Recognition Framework, competencies may be attained in a number of ways. This includes through any combination of formal or informal training and education, work experience or general life experience. In order to grant recognition of prior learning/current competency the assessor must be confident that the candidate can present evidence that he or she is currently competent against the endorsed industry or enterprise competency standards or outcomes specified in Australian Recognition Framework

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Term	Definition/Explanation
	accredited courses. The evidence may take a variety of forms and could include certification, references from past employers, testimonials from clients and work samples. The assessor must ensure that the evidence is authentic, valid, reliable, current and sufficient.
Records of assessment	The information of assessment outcomes that is retained by the Organisation that is responsible for issuing the nationally recognised Statement of Attainment or qualification.
Registered Training Organisation (RTO)	Registered Training Organisation (RTO) means a training organisation registered in accordance with the Australian Recognition Framework, within a defined scope of registration (refer definition Scope of Registration).
Reliability	See section 3.4 Assessment Principles
Sampling	See section 3.5 Assessment Processes in the Electrotechnology Industry.
Statement of Attainment	Statement of Attainment means a record of learning, recognised under the AQF, which although falling short of an AQF qualification, may contribute towards a qualification outcome, either as attainment of competencies within a Training Package, partial completion of an AQF accredited course leading to a qualification, or completion of a nationally accredited short course which may accumulate towards a qualification through Recognition of Prior Learning processes.
Sufficiency of evidence	See section 3.4 Assessment Judgments
Training Package	Training Package means an integrated set of nationally endorsed competency standards, assessment guidelines and Australian Qualifications Framework qualifications for a specific industry, industry sector or enterprise.

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Term	Definition/Explanation
Training Agreement	An agreement outlining the training and assessment which forms part of a New Apprenticeship Training Contract and is registered with the relevant State or Territory Training Authority.
Training Plan	Training Plan means a program of training and assessment which forms part of a New Apprenticeship/traineeship Training Contract and is registered with the relevant State or Territory Training Authority.
Transcript of results — statement	List of candidate's modules/subjects/ EKAS learning specifications completed as part of a competency standard unit(s) or qualification.
Unit(s) of Competency / Competency standard units	Competency standard unit means the specification of knowledge and skill and the application of that knowledge and skill to the standard of performance required in the workplace. Competency Standard Units define the outcomes for training delivery and assessment and lead to the issuing of Australian Qualifications Framework qualifications and Statements of Attainment. See also *Competency Standard*.
Validity	See section 3.4 Assessment Principles
Validation	Validation involves reviewing, comparing and evaluating assessment processes, tools and evidence contributing to judgements made by a range of assessors against the same standards. Validation strategies may be internal processes with stakeholder involvement or external validations with other providers and/or stakeholders.

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2.1 Preliminary Information & Glossaries

Volume 2 Part 1

Preliminary Information

This Volume (Vol 2 Part 1) contains a Definitions/Glossary of Electricity Supply Industry Terms which should be used in conjunction with the competency standard units. In addition, the National Occupational Health and Safety Commission Glossary of Terms has been included. Users will find definitions here that clarify any Occupational Health and Safety specific terms. Where a term in the glossary is followed by a number, eg *Tools and equipment (2),* the number indicates the AQF level.

Training Package Layout

This revised Electricity Supply Industry – Generation Sector Training Package has been developed, reviewed and validated through extensive industry consultation. It reflects the views of a wide cross-section of the industry and its key stakeholders/practitioners throughout Australia.

The Training Package has been constructed as a two volume set. Volume 1 covers the overall Package framework and completion requirements for qualifications. Volume 2 includes the content details of parts and sub-sections of Volume 1. The two volumes form an integrated whole and are not to be used independently of each other.

Volume 1:

Preliminary Information

The Electricity Generation Sector Industry

Overview of Training Packages

ESI – Generation Sector Industry Training Package

Part 1 Qualifications Framework

Part 2 Competency Standards Overview and Index

Part 3 Assessment Guidelines

Appendix A – New Apprenticeships

Appendix B – Sample Assessment Instruments

Enclosures

- Enclosure **A: List of Sample Assessment Instruments**
- **Enclosure B: Administrative Forms**
- Enclosure C: Glossary of Terms

Volume 2

Preliminary Information

Part 1 Definitions/Glossary

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Part 2 Competency Standards
2.1 Competency Standard Units
2.1.1 Operations Units UEPOPS201A – UEPOPS250A
2.1.2 Operations Units UEPOPS301A – UEPOPS357A
2.1.3 Maintenance Units UEPMNT301A – UEPMNT360A
2.1.4 Operations Units UEPOPS401A – UEPOPS442A
2.1.5 Maintenance Units UEPMNT401A – UEPMNT433A
2.1.6 Operations Units UEPOPS501A – UEPOPS515A
2.1.7 Maintenance Units UEPMNT501A – UEPMNT504A
2.1.8 Imported Units
Part 3 Language, Literacy and Numeracy
Part 4 Key Competencies
Part 5 Skills Enabling Employment

Volume 1: Structure and Overview

Part 1 – Qualification Framework

Part 1 outlines how the qualifications are structured, along with scope/descriptions, composition and content. Completion and issuance requirements are provided as well as advice on flexibility arrangements, with entry and exit pathways and articulation arrangements. Titles and codes of the respective list of qualifications to be issued are also included.

Part 2 – Competency Standards Overview and Index

Part 2 outlines how the competency standards were developed (in broad terms), the industry coverage they apply to, as well as the format and construction of the individual competency standard units. The list of competency standard units and their scope/description is included in this part. Matters related to language, literacy and numeracy, access, equity and cultural diversity, and any regulatory arrangements, for which the competency standard units may apply is also included. Importantly, each Unit is interrelated and linked with the Definitions/Glossary and Essential Knowledge and Associated Skills sections of the Volume. No competency standard unit is to be used in isolation or exported without these interrelated components.

There are over 125 competency standard units included in Volume 2, each listed according to its respective industry discipline area.

Alignment to and incorporation of Competency Standards Units from the allied Transmission, Distribution and Rail Training Package are also included as are relationships between competency standard unit(s) and the key competencies and skills for employers.

Part 3 – Assessment Guidelines

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Information in Part 3 outlines how the assessment guidelines inform a Registered Training Organisation (RTO) about the infrastructure requirements to enable them to carry out training delivery assessment activities related to the Training Package. It includes such things as assessment systems, the role of RTOs, assessment pathways, recognition arrangements, assessor qualifications and sources of information.

Included also are two Appendices — Appendix A: New Apprenticeships Application and Appendix B: Sample Assessment Instruments. Appendix B contains Enclosures A, B and C: A contains a List of Sample Assessment Instruments; B contains Administrative Forms and C contains the Glossary of Terms.

Volume 2: Competency Standard Units – Content and Scope

Volume 2 contains the competency standard units in their respective CSU Schedules, eg Schedule 1 – Operations units AQF2, Schedule 5 – Maintenance units AQF4.

Volume 2 also contains a Definitions/Glossary, which provides a description/explanation of certain/assigned words that appear in this document. Also included are definitions relating to literacy and numeracy skills; Key Competencies and skills enabling employment.

Note: The two volumes form an integrated whole and must not be used independently of each other.

Definitions/Glossary

Scope

The competency standard unit described in this Part of the Training Package covers competency standard units for the Electricity Supply Industry — Generation Sector.

Application

The information contained in each competency standard unit includes the intended use of the unit for assessment and a training program(s).

References

Regulations

The work functions described by competency standard units in this Training Package may be subject to statutory regulations. Where this is the case the particular regulations will depend on local jurisdictions and knowledge and application of such regulations within the scope of the unit will be an aspect of evidence in deeming a person competent.

Reference documents

Each part of the Training Package will include a list of reference documents. These are a component of competency which assist in developing training programs and assessing competency. Reference documents include relevant legislation, regulation, industrial instruments, codes of practice, guidelines and advisory standards and policies.

Examples may include industry-preferred training and assessment models, anti-discrimination and equal employment opportunity statutes encompassing application of access, equity and cultural diversity principles associated with under-represented groups.

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Definitions – Generation

Term	Explanation
Access permits	A form-type document giving formal permission to enter a specified work area when it is safe to do so and is part of the risk control measures for the area.
Access, equity and cultural diversity	The process through which employers meet requirements set out in the relevant anti-discrimination and equal employment opportunity legislation. Primarily, this process looks to ensure that the workplace is a sound reflection of society as a whole, in that persons from a broad range of backgrounds participate in the workplace, including those with a disability; indigenous persons; those from non-English speaking backgrounds, and women. This Training Package promotes appropriate language, literacy and numeracy considerations and strategies within the training and assessment field and the Vocational Education and Training (VET) sector and the Industry.
Advanced	High degree of knowledge and skill as would be demonstrated by an ‘expert’ operative (highly developed analytical, conceptual and problem solving skills).
Alkalinity reduction	Process of controlling pH of cooling system waters to offset increasing alkalinity due to carbon dioxide loss. Required to maintain optimum pH for effective chlorination and plant protection. Usually done by sulphuric acid injection.
Analysis	Resolution of data into understandable information and its subsequent rational interpretation.
Apparatus	Equipment used in the Power Generation processes.
Ash	Residue of combustion and, in particular, the bottom ash of pulverised fuel combustion.
Assemble	Refers to the selection, visual inspection, placement and securing of components to form an item of plant, equipment or a structure
Assessment	Diagnosis of performance, classification of eligibility, award of credentials, assurance of progress of learning.

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Term	Explanation
Auxiliary steam system	Steam used to assist the generation process, such as air extraction, gland sealing.
Basic	Fundamental and simplest application.
Batching (chemicals)	Mixing required quantities of chemicals predominantly for water treatment.
Boiler	Vessel for producing steam under pressure (generic). Plant used in power production – voluminous construction that produces large volumes of high pressure steam required for the thermal power generation process. Boilers contain several stages of superheating and may also contain reheating elements.
Brine concentrator	Plant for concentrating salts in discharged cooling waters, purifying the majority of water for re-use.
Bulk	Large quantity.
Chemicals	Chemicals used in the power generation processes.
Clean	Make site, buildings, plant and equipment safe, tidy and clear of obstructions (including dirt and grime).
Codes of Practice	Relevant standards required within Australia.
Commissioning	Activities carried out to make plant ready for normal operation.
Communications	Conveying information by an approved medium.
Competency	The ability to exercise knowledge and skill in the process of carrying out required tasks/duties.
Competency Standard Unit (CSU)	Competency Standards are made up of a number of Competency Standard Units which describe a key function or role in a particular job/occupation. Each unit identifies a discrete workplace requirement and includes the knowledge and skills that underpin competency, as well as language, literacy and numeracy and OHS requirements. A CSU is usually linked to one or more AQF qualifications.
Component	Any self-contained part, combination of parts, subassemblies of units, which perform a distinctive function necessary to the operation of a system.

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Term	Explanation
Compressed	Reduced in volume.
Condensate system	Part of a generating unit steam/water cycle, in particular the low pressure water system from the condenser hot well to the boiler feed pump suction, including pumps, low pressure feed water heaters, air ejectors, water treatment plants, de-aerators.
Condenser	Chamber beneath a turbine's low pressure cylinder(s) in which steam is condensed to water.
Condensing	Make denser or more compact. Main application in the generation industry is the condensing of steam to water.
Condition changing	Voltage control. Apparatus may include tap changers, reactors and synchronous condensers.
Condition monitoring	Process of measuring key performance characteristics of an item of equipment on a continuous or regular basis, usually for the purpose of optimising maintenance requirements.
Conduct	1. Manner of doing business or work. 2. Transmission of heat or power.
Contaminated	Polluted. Degraded from a pure or desired state.
Cooling systems	Various methods of controlling temperature rise in plant by the transfer of heat to a cooling medium during the power generation process.
Coordinate	Cause to function and/or link together in a proper order.
Crisis	Time of danger, acute risk to system or plant, possibility of imminent failure or collapse.
Critical	Refers to incidents involving risk and suspense that may require a decisive and crucial response. Sequence of stages determining minimum time needed for an operation (critical path).
Decommission	Remove from service permanently or for a long period of time.
Defect	Any confirmed abnormal condition of an item whether or not this could eventually result in a failure.

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Term	Explanation
Desired	Wanted earnestly, bordering on required or necessary. The preferred option.
Diagnose and repair	Corrective maintenance which is the recognition, location and rectification of faults.
Direct (work)	Set direction/requirements and instruct or allocate staff to achieve the required outputs.
Distribution system	Integrated electricity supply system.
Dogging	Attachment of, and the direction of, the lifting of materials in conjunction with a manned crane or hoist.
Drawings	Block, wiring, PID, schematic, layout drawings and site plans.
Draft system	Plant used to supply adequate air for combustion. May include fans, air heaters, dampers etc.
Dust	Main application: fly ash that is collected in either electrostatic precipitators or fabric filters.
Efficiency	Maximising plant performance by operating to designed parameters.
Electronic equipment	Equipment where the majority of components are electronic.
Emergency response	Responding to a sudden state of danger or a condition needing immediate attention/treatment.
Enterprise	Electricity generators and their procedures and standards which can refer to isolation/permit procedures, station/depot instructions, work orders and agreed quality assurance requirements.
Enterprise procedures *Also described as Workplace procedures*	Formal arrangements of an organisation, enterprise, or statutory authority of how work is to be done and by whom.
	Note. Examples of enterprise procedures are documented in quality management systems, safety management systems, work clearance systems, work instructions, reporting systems and arrangements for dealing with emergencies.
Environment	The area surrounding the work site which can be directly or

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Term	Explanation
	indirectly affected by occurrences at the work site – includes the atmosphere, soils, drains, underground water tables and the ecosystem. Protection of the *environment* would require the proper disposal of waste materials, restriction of burning off, the correct handling of toxic substances, the containment of CFCs and the like. The protection of the environment would also include the minimisation of those factors that contribute, directly or indirectly, to the production of greenhouse gases. These contributing factors might include the minimisation of construction waste materials, the correct use of enterprise vehicles and machinery, the re-use or recycling of trade materials where possible and the overall reduction of energy usage through general awareness and the use of appropriate technologies.
Environmental control	Protection of the surrounding environment. See also *environment*
Erect	The actions of preparing foundations, the erection and stabilisation of structures and the placement of electrical equipment.
Essential knowledge and associated skills (EKAS) learning specification (LS)	Provide specific additional advice in facilitating consistency and reliability in resource development and delivery. The learning specifications are premised on the content of the Essential Knowledge and Associated Skills section of the unit. The specifications are designed to: • Provide the depth and breadth of essential knowledge and associated skills to be learned • Ensure they support the needs of the workplace • Contain assessment strategies, including a table of specifications, to increase validity, reliability and fairness • Detail the resources required for satisfactory delivery in the learning environment • Provide clarification regarding the type and quantity of evidence needed for assessment purposes • Support a variety of delivery modes (eg face-to-face, distance, computer assisted learning or other) • Provide content and structure that maximizes learning retention • Provide a clear purpose statement about their

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Term	Explanation
	relationship to the overall educational program
Explosive power tool	Ram set gun or similar tools.
External	Areas external to the power generation site.
Extra Low Voltage	A voltage less than 50 volts AC or 120 volts DC
Fabricate	To take raw stock and make detailed parts by a variety of methods, such as cutting, bending, attaching. It may be applied to metal and composite structures, electrical parts, etc.
Facilitate	Promote or help forward.
Feedwater	High pressure and high temperature treated water supplied to a boiler.
Feedwater system	Part of a generating unit's steam/water cycle, in particular the high pressure water system from the feed pump suction to the boiler including pumps, economiser high pressure feed water heaters, feedwater regulating valves.
Field (operations)	External to the main centre of operation.
Forklift	Vehicle with fork in front for lifting and moving materials.
Fuel	Used for combustion and may include coal, gas, oil, refuse.
Generation	Production of electricity.
Hardware	Material or non-moving parts of systems, including items such as insulators. 'Hardware' does not include electrical apparatus.
High Voltage	Equal to, or greater than, 1000 volts AC or 1500 volts DC.
HV	High Voltage.
HV apparatus	Equipment used for transportation and control of electricity.
Implement	Put into effect.
Inspect	To examine or check a system, assembly, component or part by visual or physical means for the purpose of identifying defects or limits.
Inspection	Examine closely.

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Term	Explanation
Install	The fitting and positioning of new plant, equipment and/or systems, and the replacement of plant, equipment and/or systems following overhaul or maintenance.
Intermediate	Skills and knowledge greater than a basic level but with room for further development available (experienced but not yet expert).
Internal	Areas internal to the power generation site.
Internal combustion duel fuel reciprocating engine	Engine having two fuel sources (normally diesel fuel and gas).
Internal combustion single fuel reciprocating engine	Engine having one fuel source.
Isolated power systems	Power systems not connected to a power grid, i.e. Alice Springs.
Key role	Essential or of vital importance.
Lay	The placement in position of underground cables in preparation for jointing and terminating.
Learning Specifications (LS)	See Essential knowledge and associated skills (EKAS) learning specification (LS)
Liaise	Communicate and cooperate with an outside organisation, section or person.
Lifting and load shifting equipment (1)	Cranes and hoists that do not require a licence to operate.
Lifting and load shifting equipment (2)	Cranes and hoists that do require a licence to operate.
Local	Controlling equipment from controls located adjacent to an item of plant.
Locomotive	A diesel or steam engine providing the motive power to haul load-carrying wagons.
Low Voltage	A Voltage greater than 50 volts AC but not exceeding 1000 volts AC, or, A Voltage greater than 120 volts DC but not exceeding 1500 volts DC.

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Term	Explanation
Lubrication	Minimisation of friction by the application of specified oils or greases.
LV	Low Voltage.
Maintain	Preventative maintenance and the replacement of damaged or faulty components found during preventative maintenance.
Make and spread (stockpile)	The formation of, and the management of, a stockpile (usually coal).
Manage (plant operations)	Planning, preparing, organisation and actual operation of major plant start-ups or shutdowns plus the in service control of normal and abnormal plant operating conditions.
Manoeuvring	Planned and controlled movements towards a defined objective.
Material	Matter used in the power production processes including raw, processed, building plant or offices materials.
Maximum	Highest allowable limit.
Minimum	Lowest allowable limit.
Modify	Alterations, additions, adjustments or re-adjustments to existing equipment
Monitor	Maintain regular surveillance (see also *condition monitoring*).
Network	Chain of interconnected electrical conductors, integrated electricity grid system.
Non-routine	Outside normal daily operations or practices.
Occupational Health and Safety Standards	Refers to those which are relevant within Australia.
Operate	Bring about a controlled change in plant output.
Operational	Able to operate or function.
Operator (power generation)	Personnel employed to operate, monitor and control power generation plant.

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Term	Explanation
Organise	Give orderly structure to, make arrangements for or initiate (undertaking).
Others involved in, or affected by, the work	Supervisor, foreperson, other tradespersons, operations personnel and other workers.
Outage	Period of non-operation.
Perform	Carry into effect, execute (operation).
Performance testing	Check of plant output under test conditions.
Permit to work	Written approval to work (in safety and in a clearly defined area).
Plan	Formulated or organised methods by which actions are to be done in order to achieve a defined objective or outcome.
Plant	1. Apparatus associated with power production. 2. Mobile plant, ie implements and vehicles.
Prerequisite	Specific and general competencies expected to have been achieved prior to being deemed competent in this unit.
Power	Electrical energy.
Process	Controlled course of actions to achieve a required output/outcome.
Production	Produce (electrical energy) in large quantities.
Promote	Help forward, encourage.
Protection devices/schemes	Devices or a number of devices working together, to protect plant and equipment from damage during fault conditions or out of limits operations.
Plug-in printed circuit boards	The placement of individual plug-in printed circuit boards (regardless of whether the connections are plugs or soldered) which do not require any additional setting up/tuning.
Quality	Maintaining a high degree of excellence (meeting requirements/standards).
Receive	Accept delivery of (coal).

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Term	Explanation
Reclaim	Recover (coal) from stockpile.
Record	Piece of recorded information, account or fact preserved in a permanent document or electronically.
Rectification	Converting AC to DC. Process of repairing faults or failures of equipment or systems
Regulatory authority	Any organisation or department with responsibility for establishing and monitoring adherence to procedures, specifications or standards within the Generation sector.
Reliability	May be relied upon (to continue producing). Measure of the probability of failure.
Relocating	Move to a new position.
Request/Work orders	Work generated by schedules, instructions, handover details from previous shift, inspection test plant, defect cards, danger tags.
Requirements	That to which *equipment* and procedures and their outcomes must conform – includes statutory obligations and regulations and *Standards* called-up by legislation or regulations. *Requirements* may include: • codes of practice • job specifications • *Standards* called-up in specifications • procedures and work instructions • quality assurance systems • manufacturer specifications • design specifications • customer/client requirements and specifications • specified underpinning knowledge (specified in units' Evidence Guides) • National and State guidelines, policies and imperatives relating to the *environment*.
Reverse osmosis	Process of removing chemicals from (usually) water by forcing it through a semi permeable membrane using high pressure.
Rigging	Set up of slings etc. to ensure a controlled lift of materials using hoists and/or cranes.

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Term	Explanation
Ringmain	Distribution systems for either water, steam or power supplies in the form of a continuous ring.
Risk	Exposure to danger, hazards, losses etc.
SCADA control	System Control And Data Acquisition system. Screen based remote monitoring and control of a process/acquisition system.
Scaffold	Temporary elevated platform to assist or enable access for inspection or maintenance requirements.
Schedule	Planned output (generation).
Service	Procedural maintenance which would in general be of a routine nature.
Set-up	Specifications set by manufacturer and/or client/user requirements.
Shift (material)	Change or move from one place to another.
Shunting	1. Procedure for warming de-aerator. 2. Divert (train) onto a side track to clear the line.
Site	Location of power generation plant.
Stakeholders	Those who have an influence on activities (power generation).
Standard	Degree of excellence required for a particular purpose. Required quality of work.
Statutory requirements	Standards required by the relevant regulatory or licensing authority, eg Worksafe Australia, SAA Wiring rules.
Steam/Water cycle	Major or main cycle of steam and water through a boiler and/or steam turbine. Includes valves piping, heat exchangers, superheat and reheat elements, boiler drum(s) etc.
Stockpile	Accumulated stock of raw materials (mainly coal).
Strategies	Plans formed to achieve specific outcomes.
String	The placement of aerial conductors/cables in position,

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Term	Explanation
	including tensioning.
Structure	A pole or tower with associated hardware which supports electrical apparatus.
Switchboard	A combination of cubicles or switches located together that enable the connection or disconnection of electrical circuits.
Switchgear	Apparatus designed to make or break electrical connections.
Systems	Systems in the generation industry means the interaction between a number of elements requiring consideration of the total effect of the parts, rather than a concentration on any single part, and in respect of which actions and responses that are needed, may require analytical skills and techniques.
Tasks	Single items of work.
Team	People working together in a cooperative/collaborative manner.
Technical inspection	Examine closely, utilising specific criteria relevant to the apparatus concerned.
Test	Testing and/or functioning (operating) an assembly, component or part to make sure that it agrees with the applicable specifications. In this definition testing provides a way in which adjustment and/or troubleshooting/diagnosis can occur.
Test and commission	The checking of individual equipment/components for correct operation and the placement into service of the equipment or system.
Test (operational)	Operate under a strictly controlled manner to check/determine the condition of an item of plant. This may include a complete system, a complete item of plant (i.e. boiler fan) or an individual component.
Tippling	Discharging of coal (or other material) from a railway wagon.
Tools	General hand tools, portable electric tools and specialist tools.
Transfer (material)	Move or relocate.

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Term	Explanation
Transformers	Apparatus for reducing or increasing voltage in an AC system.
Transport plant and equipment	Moving mobile plant and associated equipment.
Tune	Correcting or altering a system, circuit, components or indicators to provide a specified outcome or condition.
Turbine	Wheel or rotor driven by the impact or reaction of steam or water (generic). Main plant item in thermal or hydro power production consisting of a number of stages. May include a number of turbines connected in tandem.
Undertake	Be committed to perform, or take responsibility for, work, testing etc.
Unit of Competency	See Competency Standard Unit
Waste	Substances of no further use in the power production process, ie ash.
Water quality control system	System(s) utilised to continually monitor and adjust the quality of water used in the power generation process.
Water treatment	The treatment processes used to condition raw water to make it suitable for use in the power generation processes.
Wind generator	Device to convert air currents into electrical energy.
Work completion details	Time sheets, job cards, plans and records.
Workplace procedures	See Enterprise procedures.

COMMONWEALTH OF AUSTRALIA
NOHSC
National Occupational Health & Safety Commission

OHS SUPPORT MATERIALS FOR DEVELOPERS OF COMPETENCIES AND LEARNING RESOURCES

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Glossary of OHS Terms

Terms related directly to Occupational Health and Safety

This Glossary of Occupational Health and Safety (OHS) Terms has been developed to assist competency developers and writers, reviewers of training packages and those developing any training specification or learning materials for the Vocational Education and Training environment.

In Australia we consider that the rate of workplace fatality, injury and ill-health is far too high. To reduce this toll we need to make some changes in the workplace and this requires training to enable business and workers to effectively manage safety. We must get OHS right in the competency so that the resultant learning contributes to improving the capacity of those in the workplace to manage safety. This applies not only to the 'designated' OHS units but to the integration of OHS, as appropriate, into all competencies, learning programs and learning resources.

The competency TAADES505A *Research and develop competency standards* specifies the outcomes and the knowledge and skills required to research and develop documents which outline competency requirements for a particular job function, work process, work role or specific vocational outcome. This competency cites four phases in developing a competency:

1. Research the competency area
2. Formulate competency specifications
3. Validate competency specifications
4. Finalise competency specifications.

OHS is a critical aspect of research into the competency area, and also an important aspect of work performance to be integrated within a competency.

Like a many technical areas, OHS has, to some extent, is its own language. OHS is 'owned; by many people as it impacts on all of us, however key words and terms are not always used in a consistent manner and this can lead to confusion. To maximise the effectiveness of our training and education we need to ensure that our use of the OHS language is as consistent and clear as possible.

This glossary is not intended as a definitive dictionary of OHS terms but is designed to be used in the second phase of competency development, formulate the competency specifications. It is also an invaluable tool for those involved in the design and development of learning resources.

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Further information on OHS hazards, practical guidance material, standards and codes of practice is available at the National Occupational Health and Safety Commission website at www.nohsc.gov.au

The glossary is intended to be an evolving and dynamic document and those wishing to comment on the terms or suggest additions or modifications should email the Team Leader of the OHS Skills Development Team at NOHSC.

Glossary of OHS Terms

NOHSC Term	Explanation
Accident	A term that is now considered out of date. Preferred term is *incident.*
Accountability	The process by which a person with OHS responsibilities is answerable to a higher authority.
Action level	The level at which a risk is considered to be unacceptable and action is required to reduce the level of risk. May be specific such as a noise level at which hearing protection must be worn, a concentration of chemical or more generic.
(OHS) Action plans	Documented plans developed within the workplace to implement OHS management, which include allocated responsibilities and time frames.
Administrative controls	Management practices that aim to control employees' exposure to specific hazards, and generally improve health and safety – examples include the use of job rotation, job enlargement
ALARA (As Low As Reasonably Achievable)	A basic concept where risks are kept as low as is reasonably achievable. ALARA is determined by reference to established codes and standards and consultation with groups impacted by the decision outcomes including those exposed to the risk.
Anthropometry	The science dealing with the comparative measurement of the size and proportions of the human body, the range of movement of limbs, as used in ergonomics.
(OHS) Audit	A systematic examination against an agreed benchmark of the approach to managing safety to evaluate an organisation's arrangements for identifying hazards, assessing and controlling risks, and monitoring and improving the effectiveness of the management of OHS and compliance. (Note a workplace inspection

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NOHSC Term	Explanation
	is NOT an audit.)
Audit tools	The instruments for collecting evidence and conducting the analysis and evaluation (they are not the same as the audit criteria or benchmark), they may be: • developed specifically for the purpose • adapted from existing tools • purchased or accessed from existing tools • and include: • performance checklists • sets of questions to be asked • descriptions of required characteristics to be checked • limitations for and instructions for use
Authorisation of permit	Signing of permit by competent person.
Biomechanics	The application of mechanics (forces and motion) to analyse body movement and the stresses involved in body posture during movement.
Causative event	Key event that resulted in the particular outcome(s) of injury or damage.
Circumstance	Short-term situation that is relatively unusual, such as a storm or when a key person is absent.
Certification	Refer *operator certification.*
Common law	Law that is derived from the English legal system and has evolved through judicial decision and practice (case law) that establishes and follows precedent. Note difference to 'statute law'.
Condition	Permanent situation such as type of equipment, work practice, design of work environment (often different to detect or identify) that may contribute to risk.
Consequence	The injury or damage outcome of an event, which may be expressed quantitatively or qualitatively, there may be a range of possible outcomes for a specific event or scenario.
Confined space References • AS/NZS 2865:2001 *Safe working in a*	An enclosed or partially enclosed space which: • is at atmospheric pressure during occupancy • is not intended or designed primarily as a place of work, and is liable at any time to –

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NOHSC Term	Explanation
confined space • Handbook – *HB 213:2003 Guidelines for safe working in a confined spa*ce	• have an atmosphere which contains potentially harmful levels of contaminant • not have a safe oxygen level or • cause engulfment, and • may have restricted means for entry and exit. A confined space is determined in part by the hazards associated with a defined set of circumstances (restricted entry or hazardous atmosphere, risk of engulfment) and not just with work performed in a restricted space. Examples include but may not be limited to: • storage tanks, tank cars, process vessels, boilers, pressure vessels, silos and other tank-like compartments • open-topped spaces such as pits or degreasers • pipes, sewers, shafts, ducts and similar structures • shipboard spaces entered through a small hatchway or access point, cargo tanks, cellular double bottom tanks, duct keels, ballast and oil tanks and void spaces (but not including dry cargo holds). A person is deemed to have entered a confined space when his/her head (ie the breathing zone) or upper part of the body is within the boundary of the confined space. (Note that inserting an arm for atmospheric testing is not considered an entry to a confined space).
Consultative arrangements	State and Territory OHS legislation specifies obligations for workplace consultation. The workplace arrangements to meet these obligations may include: • OHS and other consultative and planning committees • health and safety and other employee representatives • employee and supervisor involvement in OHS activities such as inspections and audits • procedures for reporting hazards, and raising and addressing OHS issues • employee and workgroup meetings. Factors that should be considered when developing consultative arrangements include: • language • shift work and rostering arrangements • timing of information and data provision • literacy and numeracy levels • workers with special needs • workplace organisational structures, eg size of organisation,

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NOHSC Term	Explanation
	geographic, hierarchical • cultural diversity • management approach • workplace culture and approach to OHS by managers, supervisors and employees.
Controls	The devices and methods of controlling the effect of the hazard so that the risk of injury is minimised. The 'quality' of the control is the level and reliability of the control compared with the level of risk. The quality of the controls is determined by: • the best available technology or approach should be applied when the most probable outcome is death or serious injury • the best practical technology or approach may be applied where the most probable outcome is less serious Refer also *Hierarchy of control*. Workplace factors that impact on the controls selected and the implementation include*:* • language • shift work and rostering arrangements • literacy and numeracy • workplace organisational structures (e.g. geographic, hierarchical) • cultural diversity • training required • workplace culture related to OHS, including commitment by managers and supervisors and compliance with procedures and training.
Control measures	Devices, systems (including work methods) or approaches that reduce exposure to workplace hazards
Crisis management plan The term *emergency management* may also apply but *crisis management* infers a more holistic approach encompassing the full range of business affairs.	A flexible document that can cope with a broad range of crisis types and: • is approved at the highest levels of the organisation • focuses on management control • identifies responsibilities for decision making • details communication processes and psychological support • addresses arrangements with any contractors or shared tenancy • integrates the emergency response plans as well as recovery

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NOHSC Term	Explanation
	• incorporates dealing with external agencies and support • addresses planning for recovery before crisis occurs. Documentation for a crisis management plan may include: • policy • emergency response structure • initial response instructions for various roles/areas, responsibility and authority of individual roles • warning systems • training requirements • resource inventory for response and recovery • program review and monitoring processes • risk management documentation, such as team lists, communications strategies, identification of issues, risk assessments/evaluations, vulnerability profiles, risk registers and treatment strategies.
Dangerous Goods (DG)	Those gases, liquids and solids identified and classified under the internationally agreed system which is followed in Australia and that are subject of so called 'dangerous goods' standards and legislation. The objective of the Dangerous Goods legislation is to control the storage, handling and transport of DGs to protect the safety of workers, the public, property and the environment. While dangerous goods may also be hazardous the terms should not be confused.
Dangerous parts of plant	Potential contact or entrapment points to which the operator may be exposed during: • operation • examination • lubrication • adjustment • maintenance
Design	The process of bringing together innovation, aesthetics, and functionality to plan and create a product, process or system to meet the artistic, industrial or performance requirement of an individual or group. The Design Process involves a series of activities where an idea is conceived, shaped, developed, produced and then acted upon to produce a design product. It also includes any subsequent alteration of a design product (redesign or retrofit).
Design process	The stages of the design process include: • the concept design phase. This phase includes concept design,

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NOHSC Term	Explanation
	research and development, feasibility and risk management (including OHS risks). In this phase preliminary design options are considered and assessed against product specifications to determine the best preliminary design • the detailed design phase. In this phase the selected design is developed to its final state. This includes research and development, feasibility studies, concept and detail design, technical and functional specifications, plans and drawings, operational systems, construct/manufacture options and detailed quantities, cost and risk analysis (including analysis of OHS risks).
Designed-product	The item to be designed, including a built environment, structure, an item of plant or equipment, chemical, work system or process; or any other physical attribute or system associated with either the work or its interface with people.
Duty of care	Arises from common law but is enshrined in OHS statute law and/that places into a legal form a moral duty to anticipate possible causes of injury and illness and to do everything reasonably practicable to remove or minimise these possible causes of harm. The key factors relating to duty of care are that: • duty of care applies wherever there is special relationship (employer – employee, employer – contractor, supervisor – work team member, tradesperson – apprentice) • duty of care applies to all circumstances of the relationship • individual duty of care cannot be delegated (but roles and functions may be delegated) • applies personally to individuals • applies to all risks that are foreseeable and preventable • includes the concept of *reasonable.*
Elements of systematic approaches to managing OHS *including OHSMSs*	A list of key requirements or major principles that are combined in a methodical and ordered manner to minimise the risk of injury or ill health in the workplace; and may include processes of OHS planning, allocation of resources, communication and consultation, hazard management, record keeping and reporting, training and competency, and review and evaluation for ongoing improvement of OHS.
Emergency	Events such as: • serious injury events • emergencies requiring evacuation • fires and explosions

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NOHSC Term	Explanation
	• hazardous substance and chemical spills • explosion and bomb alerts • security emergencies, such as armed robberies, intruders and disturbed persons • internal emergencies, such as loss of power or water supply and structural collapse • external emergencies and natural disasters, such as flood, storm and traffic accident impacting on the organisation. May also be referred to *hazardous event*.
Emergency agency	Includes fire, police, ambulance, relevant government departments, hazardous materials response teams (HAZMAT) and OHS authorities.
Emergency control organisation (ECO) is:	Structured group within the organisation that includes roles such as emergency controller, communications recorder, media liaison and employee support.
Emergency equipment	Includes: • first aid equipment • eye wash shower or portable eye washes • fire extinguishers and equipment • communication equipment • evacuation alarms • evacuation equipment, especially that for disabled persons • torches • clothing items such as coloured hats and vests.
Emergency stops and warning devices	Are fitted to plant and equipment that have a risk of entrapment or other hazard and must be: prominently, clearly and durably marked coloured red (push buttons, bars or handles) unable to be affected by electrical or electronic circuit malfunction fitted where risk assessment identifies a need.
Enforcement	Processes and instruments available to the OHS regulator under legislation may include*:* • prosecution • prohibition notices • improvement notices • on-the-spot fines • provisional improvement notices.

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NOHSC Term	Explanation
Epidemiology	The study of the distribution and determinants of disease within human populations. Patterns of injury or illness in groups of people are studied to determine causes, identify groups at risk and to identify and evaluate methods of treatment and prevention.
Ergonomics	The study of the relationship between people, the equipment they use and their physical and social work environment.
Ergonomic interventions	Includes: • design of tools • design of workplaces • design of products • design of equipment • design of work systems, processes or organisation including work flow, planning and control • job design • development of new decision making processes • new forms and organisations of work
Ergonomic tools and databases	May include: • engineering models • Australian and International Standards • Australian and International anthropometric databases
Explosive substance	Substance that explodes if it comes into contact with heat, flame, an ignition source or incompatible substance.
Fail-to-safe	Design feature of equipment that ensures if there is a failure or defect in the product, or another factor such as loss of power, then the product is left in a safe condition.
Functional areas and management systems	Other than OHS but that impact on the management of OHS may include: • strategic planning • purchasing, procurement and contracting • logistics • HR, IR and personnel management, including payroll • engineering and maintenance • information, data and records management • finance and auditing • environmental management • quality management.

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NOHSC Term	Explanation
Guarding	Devices fitted to machinery to separate the operator from dangerous parts of the machine. Devices may include: • permanently fixed physical barriers where no access of any part of a person is required • interlocking physical barriers where access to dangerous areas is required during operation • physical barriers securely fixed by means of fasteners or devices • presence-sensing safeguarding systems.
Hazard	A source or a situation with a potential for harm in terms of human injury or ill-health, damage to property, damage to the environment, or a combination of these.
Hazards of long latency	Conditions, illnesses and other health risks that result from longer term exposure to specific triggers such as chemicals, noise, radiation and psychosocial factors.
Hazards of low frequency/high consequence	High impact events that occur rarely such as explosions, fires and building collapses but may result in very serious injury, death or multiple death situations.
Hazard identification	The process of identifying sources of harm. Hazard identification may be required: • at design or pre purchase of buildings, equipment and materials • at commissioning or pre-implementation of new processes or practices • before new forms of work and organisation of work are implemented • before changes are made to workplace, equipment, work processes or work arrangements • as part of planning major tasks or activities, such as equipment shutdowns • following an incident report • when new knowledge becomes available • at regular intervals during normal operations • prior to disposal of equipment, buildings or materials. Different methods may be used to identify hazards, including: • observation • consultation with workers, clients or other users • trial of models or prototypes • review of technical standards and other information sources

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NOHSC Term	Explanation
	• monitoring and measurement.
Hazard identification tools and processes	These include: • analysis of incident investigations • analysis of incident, injury and claims statistics • workplace inspections • job safety analysis (JSA) • audits • cause and effect diagrams • surveys • review of research and industry literature.
Hazardous event	Includes incidents with the potential to seriously harm life, health, property, the environment or a combination. May also be referred to as *emergencies*.
Hazardous substance	A substance that is listed on the National Commission's List of Designated Hazardous Substances (NOHSC:10005) or has been classified as a hazardous substance by the manufacturer or importer in accordance with the National Commission's Approved Criteria for Classifying Hazardous Substances (NOHSC:1008).
Hazardous substance register	Listing of all the hazardous substances that are used or produced in a workplace together with a current Material Safety Data Sheet for each substance. May also contain risk assessments for individual hazardous substances.
HAZCHEM	An initial response emergency action code that provides information vital to emergency services to enable them to stabilise the incident scene during the early stages of a HAZMAT incident. The Code is displayed on emergency information panels on transport vehicles and on signs on buildings. HAZCHEM codes are assigned to chemicals on the basis of their flammability, toxicity, reactivity and other relevant chemical and physical properties.
HAZMAT	A contraction of the words *hazardous materials* and may be used in a range of circumstances including HAZMAT emergency response units, HAZMAT emergency response equipment and HAZMAT registers of hazardous substances.
HAZOP (Hazard and Operability Study)	An advanced risk analysis technique that involves a systematic review of a process to determine risks and risk minimisation strategies.
Health and safety	An employee, elected by the workgroup, who represents the OHS

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NOHSC Term	Explanation
representative	interests of the people with whom they work. The function is carried out in addition to the normal work role. Processes for election of health and safety representatives, their role and rights are specified in state and territory legislation.
Health promotion	The promotion of health, especially as a workplace program, designed to improve and enhance employee health undertaken as a complementary activity to the prevention of work-related injury and disease. Also called *wellness*.
Health surveillance	Monitoring or checking individuals for the purpose of identifying changes due to exposure to hazards in the workplace. May include biological monitoring.
Hierarchy of control	The priority order in which hazard and risk controls should be considered with the eventual outcome often being a combination of measures. The prime emphasis is on ***elimination***, and where this is not practicable, ***minimisation of risk*** by: • substitution • isolating the hazard from personnel • engineering controls • administrative controls, eg procedures, training • personal protective equipment (PPE)
Hot work	Involves using equipment that generates heat, sparks, flames or any other sources of ignition in an atmosphere that may be flammable. It includes work with welders and cutters, including oxygen cutters, power tools, grinding, mobile phones. Hot work can also include breaking into 'live' equipment or performing work on live equipment that has the potential to release its contents, eg hot tap in chemical plants.
Housekeeping	Describes workplace and personal routines designed to improve hygiene and safety, for example, cleaning up spills and keeping walkways, exits and traffic areas clear.
Incident	An event that has caused or has the potential for injury, ill-health or damage. (*Incident* is the preferred term rather than *accident*)
(Sources of OHS) Information*:*	May be internal, including: • hazard, incident and investigation reports

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NOHSC Term	Explanation
	• workplace inspections • incident investigations • minutes of meetings • Job Safety Analyses (JSA's) and risk assessments • organisational data such as insurance records, enforcement notices and actions, workers compensation data, OHS performance data • reports and audits • material safety data sheets (MSDSs) and registers • employees handbooks, including questionnaire results • OHS advisors • manufacturer manuals and specifications.
	Or external, including: • regulatory bodies and OHS Acts regulations, codes and guidance material • other relevant legislation • National Occupational Health and Safety Commission (NOHSC) and Australian Bureau of Statistics • databases such as national and State injury data and NICNAS (National Industrial Chemicals Notification and Assessment Scheme) • OHS specialists and consultants • newspapers and journals, trade/industry publications • Internet sites • industry networks and associations including unions and employer groups • OHS professional bodies • research information
Isolation	A safety device system that includes devices such as isolating switches, locks, safety bars, shields, full pressure blanks, spectacle blanks to lock controls, especially moving parts, equipment, systems or devices with stored energy, to an 'off' position while a worker is in a vulnerable position such as carrying out maintenance on rotating equipment, and electrical and hydraulic systems. Isolation systems generally use locking switches that need keys to open the lock and are used in conjunction with a danger tag system that promotes greater safety consciousness amongst the workforce for all situations in which danger to persons could arise from: • the operation of machinery, plant or equipment • the flow of steam, electricity, gases or liquids • the use of faulty or unsafe plant and equipment

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NOHSC Term	Explanation
	• include multiple locking systems and involve written authorisation by a competent person Also called *lock-out* and *tag-out*.
Job Safety Analysis (JSA)	Process of examining all aspects of a task to identify hazards and conditions with a potential for injury or ill health with the objective of developing risk controls including written job instructions.
Legislation relevant *to OHS*	Includes Commonwealth and relevant State/Territory OHS specific acts and regulations as well as: • workers compensation • privacy legislation • contract law • trade practices • criminal law • common law • industrial relations law • equal employment opportunity and anti-discrimination law.
Life-cycle	All phases in the life of a product. Specific phases depend on the type of product but may include: • design • development • manufacture, construction, assembly • import • supply, distribution • sale, hire, lease • storage • transport • installation, erection • commissioning, • use, operation, • consumption, • maintenance, servicing, cleaning, adjustment, inspection, repair, modification, refurbishment, renovation, recycling • resale • decommissioning, dismantling, demolition, discontinuance, disposal.
Likelihood	The likelihood of the occurrence of the consequence, not the likelihood of the hazard or the particular scenario.

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NOHSC Term	Explanation
Locked out	Equipment, which is not to be operated for any reason, may be padlocked, or otherwise prevented from operation using a keyed lock. A lockout may be accompanied by a tag out, or a lock out system may incorporate a tag. Lockout means the isolation by a mechanical device, generally a lock, which, when applied at the source, physically prevents the control to any electrical or mechanical equipment being turned on. Refer also to *Isolation*.
Manual handling	The use of force applied by a person to lift, move, carry, push, pull or otherwise move or restrain an animate or inanimate object.
Material Safety Data Sheet (MSDS)	Document describing the properties and hazards of a material or substance including statements about its chemical and physical properties, health hazards, precautions for use and safe handling instructions. All manufacturers and suppliers of chemicals are obliged to produce an MSDS for each hazardous chemical.
Monitoring	Involves the use of valid and suitable techniques to estimate the exposure of employees to a hazard.
Musculoskeletal disorder (MSD)	An injury, illness or disease that arises in whole or part from manual handling in the workplace, whether occurring suddenly or over a prolonged period of time. (Does not include injuries caused by crushing, entrapment or cut resulting primarily form the mechanical operation of plant.
Occupational Overuse Syndrome (OOS)	Previously called RSI and refers to arrange of conditions characterised by persistent discomfort and pain in and around joints and associated with repeated movement of the joint. Recent state and territory legislation tends to group these conditions with those arising from manual handling as Musculoskeletal Disorders.
OHS inspection	The process of physically examining and evaluating the extent to which hazards and risks exist, and/or particular OHS requirements, procedures or standards are being met. Refer also to *workplace inspection*.
OHS specialists	Include: • safety professionals • ergonomists • occupational hygienists • safety engineers • injury management advisors

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NOHSC Term	Explanation
	• health professionals.
Operator certification	The process by which a certificate to use or operate industrial equipment is issued by a certifying authority.
OHS management system (OHSMS)	That part of the organisation's overall management system that covers developing, implementing, reviewing and maintaining the activities for managing OHS. It is NOT a standard, a commercial package or folders on the shelf; however it may involve use of OHS management systems developed in the workplace to meet the OHS situation in that particular workplace. Also referred to in broader context as systematic approaches to managing OHS.
Operational controls for plant and equipment	Should: • be suitability identified • have nature and function clearly indicated • be readily and conveniently located • be guarded to prevent unintentional activation • be capable of locking in 'off' position to enable disconnection of all motive power and forces • be of 'fail safe' type.
Participative arrangements May also be referred to as *consultative arrangements*, however *participation* implies a higher level of involvement.	Are those arrangements that inform employees and other stakeholders of OHS matters, seek their input and offer opportunity for stakeholders to participate in decisions that may impact on their OHS.
Permit to work	A written authority document such as hot work and confined space entry that: • includes approval to undertake work and activities including tests, measurements and monitoring • is authorised by a responsible or designated person directly in control of the work • certifies appropriate precautions and controls to be followed • incorporates checklists, conditions and actions such as the frequency and duration of the work and atmospheric tests

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NOHSC Term	Explanation
	• follows recognised industry standard recording practices.
Plant	As defined in National Standard for Plant includes: • machinery, equipment (including scaffolding), appliance, implement or tool and any other component, fitting or accessory • fixed and or specified plant as cited in commonwealth, state and territory OHS legislation • mobile plant and load shifting equipment • pressure equipment such as boilers, pressure vessels and pressure piping • electrical installation and plant such as wiring, accessories, fittings, consuming devices, control and protective gear, converters and generators.
Plant Registration	The administrative process by which a certifying authority or state OHS regulator requires an organisation or industry to register plant, machinery and equipment.
Personal protective equipment (PPE)	Equipment designed to be worn by a person to provide protection from hazards, and may include: • head protection • face and eye protection • respiratory protection • hearing protection • hand protection • clothing and footwear Personal protective equipment is considered the least satisfactory control measure.
Policies and procedures	Relevant to OHS include: • policies and procedures underpinning OHS, including those for hazard and incident reporting, OHS communication, consultation, issue resolution and risk management • quality system documentation • purchasing and contracting procedures • documents describing how tasks, projects, inspections, jobs and processes are to be undertaken • standard operating procedures, work instructions • job or batch sheets, recipes • operators manuals • employee and contractor handbooks • job/task statements.

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NOHSC Term	Explanation
Positive performance indicators	Focus on assessing how successfully a workplace is performing through measuring OHS processes.
(OHS) Records	Requirements for OHS record keeping may be defined in: • OHS legislation and regulations governing reporting of incidents and maintenance of records related to specific hazards, including chemical registers and material safety data sheets (MSDSs) • privacy legislation • organisational procedures • OHS records may include: • hazard and incident reports, first aid records • risk assessments • hazardous substances and dangerous good registers, MSDSs • risk registers • OHS audit and inspection reports • maintenance and testing records • OHS training records • outcomes of health surveillance and environmental monitoring • workers compensation claims and return to work records. OHS records must be stored taking account of: • privacy • confidentiality • enabling access to personal records, within legislative requirements • commercial in confidence issues as appropriate.
(OHS) Reporting requirements	Under legislation include serious injury and serious incident reporting to OHS authorities.
(OHS) Responsibilities	Those with legislated OHS responsibilities include: • company director • manager • supervisors • OHS representatives • employees and contractors • designers, manufacturers, installers, suppliers.
Residual risk	Risk that is unable to be designed out of a product or process.
Risk Refer also to *Consequence* and	The chance of something occurring that will result in injury or damage. It is measured in terms of consequences (injury or damage) and likelihood of the consequence.

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NOHSC Term	Explanation
Likelihood.	
Risk analysis	Identifying factors influencing risk and the range of potential consequences Analysing the: • risk to effectiveness of existing controls • likelihood of each consequence considering exposure and hazard level Combining these in some way to obtain a level of risk. Factors influencing risk may be associated with: • equipment • work environment • work organisation • task • the individual/operator • frequency and duration of exposure • number of people exposed/involved.
Risk assessment Refer also to *Risk Analysis* and *Risk evaluation*.	Risk assessment is a two-step process that involves risk analysis and risk evaluation. Risk assessment as required under various OHS legislation does not necessarily require this second step of evaluation.
Risk evaluation	Comparison of risk with pre-established criteria for tolerance (or as low as reasonably achievable) and the subsequent ranking of risks requiring control. This activity will usually be carried out by or in conjunction with others with advanced OHS skills and knowledge.
Risk management	The whole systematic process directed towards identifying hazards, assessing the risk and developing controls to minimise the risk and monitoring the effectiveness of the controls (and taking further action as required).
Risk ranking	A process of rating risks according to their severity and likelihood. Common systems are based on matrices or nomograms but are usually highly subjective.
Risk register May also be referred to as *Hazard Register*.	Includes: • a list of hazards, their location and people exposed • a range of possible scenarios or circumstances under which these hazards may cause injury or damage • the results of the risk assessment, and may also include;

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NOHSC Term	Explanation
	• possible control measures and dates for implementation.
Safe Design	A design process that generates options to eliminate hazards, or minimise potential risk to health and safety of those who make the product and those that use it by involving decision makers and considering OHS risks throughout the life cycle of the designed product.
Stakeholders	In workplace OHS include: • managers • supervisors • health and safety and other employee representatives • OHS committees • employees and contractors • the community.
Standards	Relevant to OHS include: • OHS regulations and standards developed by OHS regulators • national standards (NOHSC) • Australian standards • International national standards • industry standards • codes of practice • exposure standards • guidance notes.
Statute Law	Law created by legislation passed by government (acts and regulations) as distinct from common law.
(OHS) plan	A document that: • is usually developed annually but may be developed for a shorter or longer period • reviewed regularly • has OHS performance indicators (ie objectives and targets that are achievable and practical) reflecting systematic approaches to managing OHS.
System of work	The overall process of work including: • method by which the work is carried out • organisation of the work • selection and maintenance of tools and equipment • supervision and training • selection of workers

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NOHSC Term	Explanation
	• allocation of tasks and responsibilities.
Systemic approach to managing OHS	Requires: • comprehensive processes that are combined in a methodical and ordered manner to minimise the risk of injury or ill health in the workplace • processes of planning, allocation of resources, communication and consultation, hazard management, record keeping and reporting, training and competency, and review and evaluation for ongoing improvement. • Factors that may impact on the implementation of a systematic approach to managing OHS may include: • barriers to communication, such as language/literacy • workplace culture issues, such as management commitment, supervisors' approach to compliance and general acceptance of the priority of safety • diversity of workers • structural factors, such as multiple locations, shift work and supervisory arrangements.
Tag out	Refer to *Isolation*.
Technical advisors	To the OHS function may include: • legal practitioners • engineers (such as design, acoustic, mechanical, civil) • security and emergency response personnel • workplace trainers and assessors • maintenance and trade persons.
Wellness	Refer to *Health promotion*.
Workplace policies	Comprise written statements of employer's intentions and how the employers will action those intentions in the workplace. For example OHS, access and equity, discrimination and manual handling.
Workplace inspection	Process of examining the workplace, usually with the aid of a checklist, to identify hazards and level of compliance with workplace procedures.

Some terms in the glossary have been taken from, or modified from the CCH Occupational Health and Safety Glossary, 1992 and National Guidelines for Integrating OHS Competencies into National Industry Competency Standards [NOHSC: 7025 (1998)] 2nd edition.

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2.2.1 Language, Literacy and Numeracy

Volume 2 Part 2.2

2.2.1 Language, Literacy and Numeracy

The reading, writing and numeracy skills/competencies in each competency standard unit describe the recommended prerequisite entry requirements typically needed to successfully achieve the competency. A nationally-recognised language, literacy and numeracy framework has been used to provide advice as to the relevant entry level required.

The information has been derived from the National Reporting System report, *A mechanism for reporting outcomes of adult English language, literacy and numeracy programs*, The Australian National Training Authority (ANTA) and the Department of Employment Education and Training (DEET), 1994-5, jointly funded the report. Australian Training Products Ltd (ATP) distributes it for and on behalf of Language Australia Victorian Office. Stock code 3010A, ISBN: 0 7306 7493 2, April 1999.

The report:

- identifies adult English language, literacy and numeracy competencies required in the industry
- facilitates student pathways
- generates ideas for curriculum and assessment.

The report identifies a national framework of five vertical levels of competence related to complexity of language, literacy and numeracy competence. Six interrelated horizontal aspects of communication were found to apply in relation to differing orientations of social activity involving reading, writing, speaking, listening and/or numeracy. These were categorised as:

- procedural communication for performing tasks
- technical communication for using technology
- personal communication for expressing identity
- cooperative communication for interacting in groups
- systems communication for interacting in organizations
- public communication for interacting in the wider community.

The National Reporting System report should be referred to at all times for clarification, more detailed information and advice.

For the purposes of this Training Package writing, reading and numeracy competencies, have been selected from the five-level competence structure (using the Technical Communication aspect of the national framework), as a means of providing relevant entry-level advice. Registered Training Organisations should use this information to assist them in developing appropriate entry-level learning strategies and to assist learners to meet the entry-level requirements of respective competency standard units.

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Table 6: Reading, Writing and Numeracy – Indicators of Competence

Reading

Scale	IoC*	Indicators of Competence	Technical Communication
5	**5.1** **5.2** **5.3**	Reads and interprets structurally intricate texts in chosen fields of knowledge and across a number of genres, which involve complex relationship between pieces of information and/or propositions. Interprets subtle nuances, infers purpose of author and makes judgements about the quality of an argument. Reads and critically evaluates texts containing data which includes some abstraction, symbolism, and technicality presented in graphic, diagrammatic, formatted or visual form.	Defines the purpose and objectives for the use of a particular technology, eg writes a report, which includes a detailed analysis of technology as, applied in a particular workplace or environment. Draws on prior knowledge of the application of technology in researching the capacity of a new system, eg writes a briefing and recommends purchase or use of a particular system. Uses technological principles to reduce constraints presented by environmental or physical capacity, eg writes a report, which compares the effectiveness and efficiency of manual and computerised record management systems. Prepares a written or oral report, which critically evaluates the content, structure, and purpose of technical texts including graphic, diagrammatic or numerical information. Adapts task instructions to suit changes in technology, eg writes plain English instructions for the operation of a new machine based on the manufacturer's instructions. Draws from a number of sources and uses computer skills to prepare a report, eg CV and job application letter.
4	**4.1** **4.2**	Reads and interprets structurally intricate texts in chosen fields of knowledge which require integration of several pieces of information for generating meaning. Interprets texts, which include ambiguity, and inexplicitness where reader needs to distinguish fact from opinion and infer purpose. Interprets and extrapolates from texts	Compares and contrasts views on technology in newspaper articles. Interprets the purposes and objectives for the use of technology after the reading a brochure or manual. Selects technological practices to conform with the guidelines for heath and safety, environmental impact and ethical practice, and uses them within those guidelines.

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Scale	IoC*	Indicators of Competence	Technical Communication
		containing data which includes some abstraction, symbolism, and technicality presented in graphic, diagrammatic, formatted or visual form.	Uses guidelines to ensure technological equipment is used to its full capacity. Uses a computer to prepare a typed report from a hand-drafted report. Compares and contrasts different technologies and their impact, eg argues the case for new practices when using new technologies, reports on the effects of installation of new machinery. Writes a report on the impact of a particular technology for a specific audience, eg management committees, tri-partite committees. Reads a complex diagram to identify components and procedures for dealing with a technical fault or breakdown.

IoC* – Indicators of Competency sub-level

Note: The five levels of competence (interrelated with six aspects of communication of the National Reporting System) is not an assessment system. It is not curriculum. It is not a model of language acquisition. It is not a means for categorising students by a simple "level", nor is it a set of broad competency statements. It is not a recruitment instrument for employers. The NRS suggests that the "*report of a person's competence derives from the interplay between the chosen activity, the features of the text/task, and the context and level of support under which the activity is performed*".

Scale	**IoC***	**Indicators of Competence**	**Technical Communication**
3	**3.1** **3.2** **3.3**	Reads and interprets texts of some complexity, integrating (where relevant) a number of pieces of information in order to generate meaning. Displays awareness of purpose of text, including unstated meaning. Interprets and extrapolates from texts containing data which is unambiguously presented in graphic, diagrammatic, formatted or visual form.	Reads a technical manual where the information is supported by diagrams, sufficiently well to be able to locate and comprehend particular information required, eg programs a VCR to record two programs in advance. Uses the author, title, key word and other search indexes of a library computer. Comprehends short summary information on computer-managed learning packages to choose a relevant package to suit own needs. Uses the word processing program on a

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Scale	IoC*	Indicators of Competence	Technical Communication
			computer to produce texts. Writes simple instructions for using familiar technology, eg how to use an automatic teller machine. Completes a formatted workplace test, eg damage or breakdown report. Writes a brief report on uses of technology, eg for classroom, workplace, domestic or community purposes.
2	**2.1** **2.2**	Reads and interprets short simple texts on a personally relevant topic. Locates specific information relating to familiar contexts in a test which may contain data in simple graphic, diagrammatic, formatted or visual form.	Reads short, relevant, explicit, clearly formatted texts related to technology, eg the author and title index of a library computer. Chooses a computer assisted learning package, having read short descriptions of one or two programs, to acquire a defined skill or area of knowledge. Writes a short description, eg describes a damaged part of a machine to facilitate repair. Extracts information from a list with language and numeracy components, eg price lists of components for computer systems. Records simple and routine information using the telephone, eg takes a phone message, on a form designed for this purpose. Interprets instructions, which combine pictorial and written information, eg directions on how to operate a piece of machinery safely.
1	**1.1** **1.2**	Reads and identifies letter of the alphabet in the context of whole words, numbers, signs and symbols relating to personal details and immediate environment. Identifies specific information in a personally relevant text with familiar content, which may include personal	Recognisees very short, explicit, pictorial texts, eg understands logos related to worker safety before using a piece of machinery, reads letters on a keyboard. Reads graphic instructions accompanying a new piece of technology to learn new information or skills about a technology or medium, eg uses an automatic teller

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Scale	IoC*	Indicators of Competence	Technical Communication
		details, location or calendar information in simple graphic, diagrammatic, formatted or visual form.	machine by following instructions given graphically on the screen. Types own name or single words into a computer-assisted learning program.

Writing

Scale	IoC*	Indicators of Competence	Technical Communication
5	**5.4** **5.5**	Demonstrates well-developed writing skills by selecting stylistic devices to express complex relationships between ideas and purposes. Generates complex written texts with control over generic structure.	Defines the purpose and objectives for the use of a particular technology, eg writes a report, which includes a detailed analysis of technology as, applied in a particular workplace or environment. Draws on prior knowledge of the application of technology in researching the capacity of a new system, eg writes a briefing and recommends purchase or use of a particular system. Uses technological principles to reduce constraints presented by environmental or physical capacity, eg writes a report, which compares the effectiveness and efficiency of manual and computerised record management systems. Prepares a written or oral report, which critically evaluates the content, structure, and purpose of technical texts including graphic, diagrammatic or numerical information. Adapts task instructions to suit changes in technology, eg writes plain English instructions for the operation of a new machine based on the manufacturer's instructions. Draws from a number of sources and uses computer skills to prepare a report, eg CV and job application letter.
4	**4.4**	Communicates complex relationships between ideas by matching style of writing to purpose and audience.	Compares and contrasts views on technology in newspaper articles. Interprets the purposes and objectives for the use of technology after the reading a brochure

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Scale	IoC*	Indicators of Competence	Technical Communication
	4.5	Generates written texts reflecting a range of genres and using appropriate structure and layout.	or manual. Selects technological practices to conform with the guidelines for heath and safety, environmental impact and ethical practice, and uses them within those guidelines. Uses guidelines to ensure technological equipment is used to its full capacity. Uses a computer to prepare a typed report from a hand-drafted report. Compares and contrasts different technologies and their impact, eg argues the case for new practices when using new technologies, reports on the effects of installation of new machinery. Writes a report on the impact of a particular technology for a specific audience, eg management committees, tri-partite committees. Reads a complex diagram to identify components and procedures for dealing with a technical fault or breakdown.

Note: IoC* - Indicators of Competency sub-level

Writing – continued

Scale	IoC*	Indicators of Competence	Technical Communication
3	**3.4** **3.5**	Communicates relationships between ideas through selecting and using grammatical structures and notations, which are appropriate to the purpose. Produces and sequences paragraphs according to purpose of text.	Reads a technical manual where the information is supported by diagrams, sufficiently well to be able to locate and comprehend particular information required, eg programs a VCR to record two programs in advance. Uses the author, title, key-word and other search indexes of a library computer. Comprehends short summary information on computer-managed learning packages to choose a relevant package to suit own needs. Uses the word processing program on a computer to produce texts. Writes simple instructions for using familiar

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Scale	IoC*	Indicators of Competence	Technical Communication
			technology, eg how to use an automatic teller machine. Completes a formatted workplace test, eg damage or breakdown report. Writes a brief report on uses of technology, eg for classroom, workplace, domestic or community purposes.
2	**2.3** **2.4**	Writes about a familiar topic using simple sentence structure and joining ideas through conjunctive links where appropriate. Completes forms or writes notes using factual or personal information relating to familiar contexts.	Reads short, relevant, explicit, clearly formatted texts related to technology, eg the author and title index of a library computer. Chooses a computer assisted learning package, having read short descriptions of one or two programs, to acquire a defined skill or area of knowledge. Writes a short description, eg describes a damaged part of a machine to facilitate repair. Extracts information from a list with language and numeracy components, eg price lists of components for computer systems. Records simple and routine information using the telephone, eg takes a phone message, on a form designed for this purpose. Interprets instructions, which combine pictorial and written information, eg directions on how to operate a piece of machinery safely.
1	**1.3** **1.4** **1.5**	Copies letters of the alphabet, numbers, and dates in order to convey personal details such as name, address, telephone number. Writes basic personal details about self or others such as name, address, and signature. Writes one or two phrases/simple sentences conveying an idea, message or opinion drawing from a modelled text.	Recognisees very short, explicit, pictorial texts, eg understands logos related to worker safety before using a piece of machinery, reads letters on a keyboard. Reads graphic instructions accompanying a new piece of technology to learn new information or skills about a technology or medium, eg uses an automatic teller machine by following instructions given graphically on the screen. Types own name or single words into a computer-assisted learning program.

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Numeracy

Scale	IoC*	Indicators of Competence	Technical Communication
5	**5.10** **5.11** **5.12**	Interprets, selects and investigates appropriate mathematical information and relationships highly embedded in an activity, item or text. Selects and applies a wide range of mathematical strategies flexibly to generate solutions to problems across a broad range of contexts. Uses a wide range of oral and written informal and formal language and representation including symbols, diagrams and charts to communicate mathematically.	Calculates distance, length and location using the trigonometry and geometry of triangles in relevant situations, eg locates grid reference on a map for a boat travelling on an given bearing with time and speed specified; uses dimensions provided on a scaled plan of a roof to find the pitch or slope of the roof. Calculates quantities of materials to title the roof applying a 4% allowance for wastage. Plans and gathers information on a negotiated topic form a variety of sources including government, industry and media about relevant community or workplace issues. Organises information by grouping. Graphically represents and analyses information for a particular purpose. Presents, individually or in a team, a report expressing a viewpoint, which is substantiated by discussion of supporting statistical evidence. Interprets and applies metric quantities and numbers in scientific notation, eg calculates the amount of oil in litres spilled from a tanker if it covers a surface area of water of approximately 1200 hectares (1.2 x 107m2) to a thickness of 6 x 103mm. Uses financial formulae, eg simple and compound interest to calculate and contrast the interest incurred in borrowing money from financial institutions.
4	**4.10** **4.11** **4.12** **4.13**	Selects and investigates appropriate mathematical information and relationships embedded in an activity, item or text. Selects and applies an expanding range of mathematical strategies flexibly to solve problems in a variety of contexts. Examines and questions the appropriateness, possible	Uses ratio and scale to interpret dimensions on a basic plan. Applies similarity and ratio to estimate and calculate lengths, eg finds height of a building, a tree. Compares quality and costs of using imported vs Australian tiles, discount vs brand name paints. Presents information in appropriate graphical format to show different interpretations and influences, eg analysis of government spending on education.

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Scale	IoC*	Indicators of Competence	Technical Communication
		interpretations and implications of aspects of a mathematical activity. Uses a range of oral and written informal and formal language and representation including symbols, diagrams and charts to communicate mathematically.	Applies formulae and interprets results relevant to a familiar practical situation, measuring the dimensions needed and substituting them into the formula, adjusting units where necessary, eg length of edging for circular garden or pond, capacity of a water tank or bath. Uses area and perimeter to calculate a range of options, eg given a certain length of fencing, plan a range of options for paddock dimensions, which meet specific area requirements. Calculates and contrasts monthly income from average sales, given a variety of salary options involving retainers and commission rates.

Note: IoC* - Indicators of Competency sub-level

Scale	IoC*	Indicators of Competence	Technical Communication
3	**3.10** **3.11** **3.12** **3.13**	Selects appropriate mathematical information embedded in a real life activity, item or text. Selects and applies a range of mathematical strategies to solve problems in a number of familiar contexts which may be interrelated. Reflects on and questions reasonableness and appropriateness of the purpose, process and outcomes of a mathematical activity. Uses oral and written, informal and formal language and representation, including symbols and diagrams, to communicate mathematically.	Uses a distance scale to find the shortest route between two locations on a map and considers road terrain conditions in deciding preferred route. Expresses and calculates with metric quantities, eg interprets and costs quantities of cheese given different forms such as 350g, 0.35kg. Measures common three-dimensional shapes, eg room, and represents the information on an appropriate diagram drawn to scale. Calculates with common, fractions and metric measurements, eg adjusts the quantities in a recipe by halving or doubling to obtain the required amount. Uses a variety of methods to analyse advertising by comparing savings on a number of different items, eg at 12% off, 15% off, 1/3 off, price reduced by $10. Compares casual and permanent rates of pay over a given time span for work of

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Scale	IoC*	Indicators of Competence	Technical Communication
			the same nature.
2	**2.9** **2.10** **2.11** **2.12**	Locates relevant mathematical information in a familiar real life activity text. Selects and uses straightforward mathematical actions in a familiar and predictable contexts. Uses estimation and prior experience to examine purpose and check reasonableness of the process and outcomes of a mathematical activity. Uses oral, written, informal and formal language and representation, including symbols and diagrams, to communicate mathematically.	Compares measurements taken with estimated lengths of familiar objects, eg estimates and measures storeroom dimensions.
1	**1.10** **1.11** **1.12** **1.13**	Locates simple key mathematical information in a familiar real life activity text. Recognises and uses straightforward mathematical actions which relate to immediate contexts. Uses rough estimation and prior experience to identify purpose and check reasonableness of the process and outcomes of a mathematical activity. Uses everyday informal spoken language and representation including familiar symbols and diagrams to communicate mathematically.	Estimates lengths of familiar objects using metric units, eg a person's height, height of doorway.

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UEP20112 Certificate II in ESI Generation - Operations Support

Modification History

Release	Action	Core/Elective	Details	Points
2	Add	Group B	UEPMNT201A – Carry out routine work activities in an electricity supply industry generation industry	40
2	Update	Group A	CPCCCM2007B - Use explosive power tools	15
3	Edit	Core	Correct weighting points of UEPOPS206B – Conduct minor electrical maintenance	40
3	Edit	Group B	Correct weighting points of UEPOPS248B – Operate and monitor an internal combustion dual fuel reciprocating engine	40

Description

Scope: Those gaining this qualification will be able to complete work functions such as local operation of non critical plant systems, lubrication of plant, undertake minor maintenance of both electrical and mechanical equipment, plant cleaning, and the operation of mobile load shifting plant and equipment, observation of safe working practices and environmental procedures.

Pathways Information

Not applicable.

Licensing/Regulatory Information

Not applicable.

Entry Requirements

Not applicable.

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Employability Skills Summary

Not applicable.

Packaging Rules

Completion requirements:

The requirements for granting this qualification will be met when competency is demonstrated and achieved for:

- All the Core competency standard units, defined in the Core Competency Standard Units table below and
- A combination of Elective competency standard units to achieve a total weighting of 220 points in accordance with the Elective Competency Standard Units table below.

Core Competency Standard Units All core competency standard units to be achieved		**Weighting Points**
UEENEEE101A	Apply Occupational Health Safety regulations, codes and practices in the workplace	20
UEPOPS202B	Apply Quality Systems to Work	20
UEPOPS204B	Maintain and Utilise Records	20
UEPOPS209B	Perform Process Plant Inspection	30
UEPOPS252A	Undertake Local Systems Operations	30
UEPOPS356B	Apply Environmental and Sustainable Energy Procedures	20
Total points in core		**140**

Elective Competency Standard Units Complete Elective units to achieve a total weighting of 220 points from the following groups:		
Group	**Minimum points**	**Maximum points**
A Imported and Common Elective Units Imported units from other training packages and/or state accredited courses can be added to this group, but they	0	60

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must be selected from qualifications where the unit is first packaged at AQF level 2. If units have not being assigned a weighting by the relevant EE-Oz Industry Technical Advisory Committee, their weighting will be 10 points.		
B Qualification Elective Units You may select all your elective units from this Group	160	220

Group A - Imported and Common Elective Units. Complete units to a maximum weighting of 60 points		**Weighting Points**
CPCCCM2007B	Use explosive power tools	15
CPCCLDG3001A	Licence to perform dogging	30
CPCCLHS3001A	Licence to operate a personnel and materials hoist	30
CPCCLHS3002A	Licence to operate a materials hoist	20
CPCCLRG3001A	Licence to perform rigging basic level	40
CPCCLRG3002A	Licence to perform rigging intermediate level	40
CPCCLSF2001A	Licence to erect, alter and dismantle scaffolding basic level	40
CPCCLSF3001A	Licence to erect, alter and dismantle scaffolding intermediate level	40
MEM05004C	Perform routine oxy acetylene welding	20
MEM05007C	Perform manual heating and thermal cutting	20
MEM05012C	Perform routine manual metal arc welding	20
RIIMPO304B	Conduct wheel loader operations	40
RIIMPO308B	Conduct tracked dozer operations	40
RIIMPO309A	Conduct wheeled dozer operations	40

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RIIMPO319A	Conduct backhoe/loader operations	50
TLILIC2001A	Licence to operate a forklift truck	40
TLILIC0012A	License to operate a vehicle loading crane (Capacity 10 meter tonnes and above)	40
TLILIC2005A	License to Operate a Boom Type Elevating Work Platform (Boom length of 11 metres or more)	30
TLILIC3006A	Licence to operate a non-slewing mobile crane (greater than 3 tonnes capacity)	60
	Imported units from other training packages and/or state accredited courses can be added to this group, but they must be selected from qualifications where the unit is first packaged at AQF level 2. If units have not being assigned a weighting by the relevant EE-Oz Industry Technical Advisory Committee, their weighting will be 10 points. Note: For further information see Application of the NQC Flexibility Formula, Page 10, UEP12 ESI Generation Sector Training Package,Part1.1.00.	Up to 60 points

Group B Qualification Electives. At least 160 points to be achieved from this group. You may select all your elective units from this Group.		**Weighting Points**
UEENEEE102A	Fabricate, dismantle, assemble of utilities industry components	40
UEPOPS203B	Operate and Monitor Communications Systems	20
UEPOPS205B	Conduct Minor Mechanical Maintenance	40
UEPOPS206B	Conduct Minor Electrical Maintenance	40
UEPOPS207B	Perform Plant Lubrication	20
UEPOPS210B	Conduct First Response within a Workplace Team	30
UEPOPS211B	Clean Plant and Equipment	20

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UEPOPS232B	Transport Plant and Equipment	20
UEPOPS237B	Perform Tool Store Duties	20
UEPOPS238B	Maintain Battery Banks and Cells	30
UEPOPS240B	Operate and Monitor Fuel Supply (Coal)	40
UEPOPS241B	Operate and Monitor Ash and Dust Disposal Plant	40
UEPOPS242B	Operate and Monitor Dust Collection Plant	40
UEPOPS243B	Operate Air Conditioning Plant	30
UEPOPS244B	Operate and Monitor Site Services Water Systems	30
UEPOPS245B	Conduct Chemical Batching Operations	30
UEPOPS246B	Operate Waste and Contaminated Water Plant	30
UEPOPS247B	Operate and Monitor an Internal Combustion Single Fuel Reciprocating Engine	40
UEPOPS248B	Operate and Monitor an Internal Combustion Dual Fuel Reciprocating Engine	40
UEPOPS249B	Liaise with Stakeholders	20
UEPOPS251A	Conduct Routine Wind Turbine Maintenance	40
UEPMNT201A	Carry out routine work activities in an electricity supply industry generation industry	40

Note:

1. Prerequisite pathways shall be identified and met for all elective units selected.

2. In selecting elective units considerations to career planning advice should be given to units that form part of a prerequisite pathway for the progression to achieve particular competencies or qualification at a higher level.

END OF QUALIFICATION

Custom Content Section

Not applicable.

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UEP30112 Certificate III in ESI Generation - Systems Operations

Modification History

Release	Action	Core/Elective	Details	Points
2	Update	Group A	Correct unit Title RIIMPO318B Conduct civil construction skid steer loader operations	70
2	Update	Group A	CPCCCM2007B Use explosive power tool	15
3	Edit	Group B	Correct weighting points of UEPOPS320B – Operate and monitor compressed air systems	30
3	Edit	Core	Correct weighting points of UEPOPS342B – Interpret and analyse single operation protection devices	60
3	Edit	Group B	Correct weighting points of UEPOPS352B – Conduct operational checks on in-service mechanical plant	40

Description

Scope: Those gaining this qualification will be able to complete work function such as local operation of plant systems, isolation of plant systems for work, operation of plant systems, routine observation and maintenance of plant and equipment in operation, observation of civil plant and infrastructure observation of safe working practices and environmental procedures.

Pathways Information

Not applicable.

Licensing/Regulatory Information

Not applicable.

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Entry Requirements

Not applicable.

Employability Skills Summary

Not applicable.

Packaging Rules

Completion requirements:

The requirements for granting this qualification will be met when competency is demonstrated and achieved for:

- All the Core competency standard units, and
- A combination of Elective competency standard units selected from Group A and/or Group B, to achieve a total weighting of 630 points.

Core Competency Standard Units All core competency standard units to be achieved		**Weighting Points**
UEENEEE101A	Apply Occupational Health Safety regulations, codes and practices in the workplace	20
UEPOPS202B	Apply Quality Systems to Work	20
UEPOPS204B	Maintain and Utilise Records	20
UEPOPS209B	Perform Process Plant Inspection	30
UEPOPS249B	Liaise with Stakeholders	20
UEPOPS252A	Undertake Local Systems Operations	30
UEPOPS301B	Conduct Single Energy Source Isolation Procedures for Permit to Work	40
UEPOPS317B	Operate and Monitor Fixed Fire Protection Systems	30
UEPOPS342B	Interpret and Analyse Single Operation Protection Devices	60
UEPOPS347B	Operate and Monitor Supervisory, Control and Data Acquisition Systems	40

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UEPOPS356B	Apply Environmental and Sustainable Energy Procedures	20
UEPOPS364A	Ensure Compliance with Occupational Health and Safety policy and procedures	20
Total points in core		**330**

Elective Competency Standard Units Complete Elective units to achieve a total weighting of 630 points from the following groups:			
Group		**Minimum points**	**Maximum points**
A	**Imported and Common Elective Units** Imported units from other training packages and/or state accredited courses can be added to this group, but they must be selected from qualifications where the unit is first packaged at AQF level 3. If units have not being assigned a weighting by the relevant EE-Oz Industry Technical Advisory Committee, their weighting will be 10 points.	0	160
B	**Qualification Elective Units** You may select all your elective units from this Group	470	630

Group A - Imported and Common Elective Units. Complete units to a maximum weighting of 160 points		**Weighting Points**
BSBFLM303C	Contribute to effective workplace relationships	40
BSBFLM305C	Support operational plan	40
BSBFLM306C	Provide workplace information and resourcing plans	40
BSBFLM309C	Support continuous improvement systems and processes	40
BSBFLM311C	Support a workplace learning environment	40

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BSBFLM312C	Contribute to team effectiveness	40
BSBINN301A	Promote innovation in a team environment	40
BSBWOR301B	Organise personal work priorities and development	40
CPCCCM2007B	Use explosive power tools	15
CPCCLDG3001A	Licence to perform dogging	30
CPCCLHS3001A	Licence to operate a personnel and materials hoist	30
CPCCLHS3002A	Licence to operate a materials hoist	20
CPCCLRG3001A	Licence to perform rigging basic level	40
CPCCLRG3002A	Licence to perform rigging intermediate level	40
CPCCLRG4001A	Licence to perform rigging advanced level	40
CPCCLSF2001A	Licence to erect, alter and dismantle scaffolding basic level	40
CPCCLSF3001A	Licence to erect, alter and dismantle scaffolding intermediate level	40
CPCCLSF4001A	Licence to erect, alter and dismantle scaffolding advanced level	40
MEM05004C	Perform routine oxy acetylene welding	20
MEM05007C	Perform manual heating and thermal cutting	20
MEM05012C	Perform routine manual metal arc welding	20
NWP318A	Monitor and Operate Gated Spillways	50
NWP319A	Monitor and Control Dam Operations	50
NWP320B	Monitor and Implement Dam Maintenance	50
RIIMPO304B	Conduct wheel loader operations	40

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RIIHAN309A	Conduct Telescopic Materials Handler Operations	80
RIIMPO308B	Conduct tracked dozer operations	40
RIIMPO309A	Conduct wheeled dozer operations	40
RIIMPO318B	Conduct civil construction skid steer loader operations	70
RIIMPO319A	Conduct backhoe/loader operations	50
TLILIC2001A	Licence to operate a forklift truck	40
	Imported units from other training packages and/or state accredited courses can be added to this group, but they must be selected from qualifications where the unit is first packaged at AQF level 3. If units have not being assigned a weighting by the relevant EE-Oz Industry Technical Advisory Committee, their weighting will be 10 points. Note: For further information see Application of the NQC Flexibility Formula, Page 10, UEP12 ESI Generation Sector Training Package, Part1.1.00	Up to 160 points

Group B Qualification Electives. At least 470 points to be achieved from this group. You may select all your elective units from this Group		**Weighting Points**
UEENEEE102A	Fabricate, dismantle, assemble of utilities industry components	40
UEPOPS203B	Operate and Monitor Communications Systems	20
UEPOPS205B	Conduct Minor Mechanical Maintenance	40
UEPOPS206B	Conduct Minor Electrical Maintenance	40
UEPOPS207B	Perform Plant Lubrication	20
UEPOPS211B	Clean Plant and Equipment	20
UEPOPS304B	Make and Spread a Stockpile	40
UEPOPS305B	Operate & Monitor Briquette Coal Cooling Plant	40
UEPOPS306B	Operate & Monitor Briquette Coal Drying Plant	40

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UEPOPS307B	Operate & Monitor Briquette Coal Press Plant	40
UEPOPS308B	Perform Briquette Laboratory Tests	40
UEPOPS309B	Operate and Monitor Air Conditioning Equipment and Ventilation Systems	20
UEPOPS310B	Operate Bulk Coal Handling Plant	40
UEPOPS311B	Operate Fabric Filter Dust Collection Plant	20
UEPOPS312B	Operate and Monitor Fuel Supply	20
UEPOPS313B	Operate and Monitor Boiler Draught System	40
UEPOPS314B	Operate and Monitor Fuel Firing Plant (Gas or Oil)	40
UEPOPS315B	Operate and Monitor Fuel Firing Plant (Coal)	40
UEPOPS316B	Operate and Monitor Boiler Steam/Water Cycle	40
UEPOPS318B	Operate and Monitor Compressed Gas Systems	30
UEPOPS319B	Operate and Monitor Gas Production Plant	30
UEPOPS320B	Operate and Monitor Compressed Air Systems	30
UEPOPS321B	Operate and Monitor Water Treatment Plant	30
UEPOPS322B	Operate and Monitor Alkalinity Reduction Plant	30
UEPOPS323B	Operate and Monitor Reverse Osmosis Plant	30
UEPOPS324B	Operate and Monitor Brine Concentrator Plant	30
UEPOPS325B	Operate and Monitor Water Quality Control Systems	30
UEPOPS326B	Operate and Monitor Oil Systems	30
UEPOPS327B	Monitor and Maintain Civil Assets	30
UEPOPS328B	Undertake Dam Safety Surveillance	30
UEPOPS329B	Operate and Monitor Auxiliary Steam Systems	40
UEPOPS330B	Operate and Monitor Heat Exchangers	40
UEPOPS331B	Operate and Monitor Water Systems (Condensate & Feedwater)	40

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UEPOPS332B	Operate and Monitor Condensing and Cooling Water System	40
UEPOPS333B	Operate and Monitor H.R.S.G. Hot Gas Control System	40
UEPOPS334B	Operate and Monitor a Wind Generator	60
UEPOPS335B	Operate A Hydro Generator/Synchronous Condenser / Pump Unit	60
UEPOPS336B	Manage Operate and Monitor a Gas Turbine Unit	60
UEPOPS337B	Maintain Quality Systems within the Team	20
UEPOPS338B	Facilitate Effective Workplace Communications	20
UEPOPS339B	Operate and Monitor a Boiler Unit	60
UEPOPS340B	Operate and Monitor a Steam Turbine	60
UEPOPS343B	Operate Hydro-Electric Generating Plant and Auxiliary Equipment	60
UEPOPS344B	Conduct Water Conveyance and Control	30
UEPOPS345B	Implement Dam Safety Surveillance Procedures	30
UEPOPS346B	Conduct Non-Routine Operational Testing	60
UEPOPS349B	Operate H.V. Primary Switchgear	40
UEPOPS351B	Operate H.V. Condition Changing Apparatus	60
UEPOPS352B	Conduct Operational Checks on In Service Mechanical Plant	40
UEPOPS354B	Operate and Monitor Dual Fuel-Firing Plant	80
UEPOPS355B	Monitor the Implementation of Under Frequency Load Shedding	60
UEPOPS357B	Operate H.V. Secondary Switchgear	40
UEPOPS358A	Monitor and Maintain Wind Farm Civil Assets	40
UEPOPS359A	Monitor Climatic Conditions for Renewable Energy Production	40
UEPOPS360A	Operate and Monitor a Hydro Turbine	60

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UEPOPS361A	Operate and Monitor Hydro Plant Auxiliary Systems	60
UEPOPS362A	Operate and Monitor Generator/Alternator	60
UEPOPS368A	Operate manual systems	30
UEPOPS369A	Respond to a critical incident	40
UEPOPS370A	Facilitate the use of contingency plans	60
UEPOPS371A	Carry out operational checks on in-service electrical plant	40

Note:

1. Prerequisite pathways shall be identified and met for all elective units selected.

2. In selecting elective units considerations to career planning advice should be given to units that form part of a prerequisite pathway for the progression to achieve particular competencies or qualification at a higher level.

END OF QUALIFICATION

Custom Content Section

Not applicable.

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UEP30212 Certificate III in ESI Generation - Operations

Modification History

Release	Action	Core/Elective	Details	Points
2	Update	Group A	Correct unit Title RIIMPO318B Conduct civil construction skid steer loader operations	70
2	Update	Group A	CPCCCM2007B Use explosive power tool	15
3	Edit	Group B	Correct weighting points of UEPOPS206B – Conduct minor electrical maintenance	40

Description

Scope: Those gaining this qualification will be able to complete work function such as local operation of plant systems, isolation of plant systems for work, operation of plant systems, routine observation and maintenance of plant and equipment in operation, observation of civil plant and infrastructure observation of safe working practices and environmental procedures.

Pathways Information

Not applicable.

Licensing/Regulatory Information

Not applicable.

Entry Requirements

Not applicable.

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Employability Skills Summary

Not applicable.

Packaging Rules

Completion requirements:

The requirements for granting this qualification will be met when competency is demonstrated and achieved for:

- All the Core competency standard units, defined in the Core Competency Standard Units table below and
- A combination of Elective competency standard units to achieve a total weighting of 620 points in accordance with the Elective Competency Standard Units table below.

Core Competency Standard Units All core competency standard units to be achieved		**Weighting Points**
UEENEEE101A	Apply Occupational Health Safety regulations, codes and practices in the workplace	20
UEPOPS202B	Apply Quality Systems to Work	20
UEPOPS204B	Maintain and Utilise Records	20
UEPOPS209B	Perform Process Plant Inspection	30
UEPOPS249B	Liaise with Stakeholders	20
UEPOPS252A	Undertake Local Systems Operations	30
UEPOPS301B	Conduct Single Energy Source Isolation Procedures for Permit to Work	40
UEPOPS352B	Conduct Operational Checks on In Service Mechanical Plant	40
UEPOPS356B	Apply Environmental and Sustainable Energy Procedures	20
UEPOPS364A	Ensure Compliance with Occupational Health and Safety policy and procedures	20
UEPOPS369A	Respond to a critical incident	40
UEPOPS371A	Carry out operational checks on in-service electrical plant	40

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Total points in core	**340**

Elective Competency Standard Units Complete Elective units to achieve a total of weighting of 620 points from the following groups:			
Group		**Minimum points**	**Maximum points**
A	**Imported and Common Elective Units** Imported units from other training packages and/or state accredited courses can be added to this group, but they must be selected from qualifications where the unit is first packaged at AQF level 3. If units have not being assigned a weighting by the relevant EE-Oz Industry Technical Advisory Committee, their weighting will be 10 points.	0	160
B	**Qualification Elective Units** You may select all your elective units from this Group	460	620

Group A - Imported and Common Elective Units. Complete units to a maximum weighting of 160 points		**Weighting Points**
BSBFLM303C	Contribute to effective workplace relationships	40
BSBFLM305C	Support operational plan	40
BSBFLM306C	Provide workplace information and resourcing plans	40
BSBFLM309C	Support continuous improvement systems and processes	40
BSBFLM311C	Support a workplace learning environment	40
BSBFLM312C	Contribute to team effectiveness	40
BSBINN301A	Promote innovation in a team environment	40
BSBWOR301B	Organise personal work priorities and development	40

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CPCCCM2007B	Use explosive power tools	15
CPCCLHS3001A	Licence to operate a personnel and materials hoist	30
CPCCLHS3002A	Licence to operate a materials hoist	20
CPCCLDG3001A	Licence to perform dogging	30
CPCCLRG3001A	Licence to perform rigging basic level	40
CPCCLRG3002A	Licence to perform rigging intermediate level	40
CPCCLRG4001A	Licence to perform rigging advanced level	40
CPCCLSF2001A	Licence to erect, alter and dismantle scaffolding basic level	40
CPCCLSF3001A	Licence to erect, alter and dismantle scaffolding intermediate level	40
CPCCLSF4001A	Licence to erect, alter and dismantle scaffolding advanced level	40
MEM05004C	Perform routine oxy acetylene welding	20
MEM05007C	Perform manual heating and thermal cutting	20
MEM05012C	Perform routine manual metal arc welding	20
NWP318A	Monitor and Operate Gated Spillways	50
NWP319A	Monitor and Control Dam Operations	50
NWP320B	Monitor and Implement Dam Maintenance	50
RIIMPO304B	Conduct wheel loader operations	40
RIIHAN309A	Conduct Telescopic Materials Handler Operations	80
RIIMPO308B	Conduct tracked dozer operations	40
RIIMPO309A	Conduct wheeled dozer operations	40
RIIMPO318B	Conduct civil construction skid steer loader operations	70
RIIMPO319A	Conduct backhoe/loader operations	50
TLILIC2001A	Licence to operate a forklift truck	40

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	Imported units from other training packages and/or state accredited courses can be added to this group, but they must be selected from qualifications where the unit is first packaged at AQF level 3. If units have not being assigned a weighting by the relevant EE-Oz Industry Technical Advisory Committee, their weighting will be 10 points. Note: For further information see Application of the NQC Flexibility Formula, Page 10, UEP12 ESI Generation Sector Training Package, Part1.1.00	Up to 160 points

Group B Qualification Electives. At least 460 points to be achieved from this group. You may select all your elective units from this Group		**Weighting Points**
UEENEEE102A	Fabricate, dismantle, assemble of utilities industry components	40
UEPOPS203B	Operate and Monitor Communications Systems	20
UEPOPS205B	Conduct Minor Mechanical Maintenance	40
UEPOPS206B	Conduct Minor Electrical Maintenance	40
UEPOPS207B	Perform Plant Lubrication	20
UEPOPS211B	Clean Plant and Equipment	20
UEPOPS304B	Make and Spread a Stockpile	40
UEPOPS305B	Operate & Monitor Briquette Coal Cooling Plant	40
UEPOPS306B	Operate & Monitor Briquette Coal Drying Plant	40
UEPOPS307B	Operate & Monitor Briquette Coal Press Plant	40
UEPOPS308B	Perform Briquette Laboratory Tests	40
UEPOPS309B	Operate and Monitor Air Conditioning Equipment and Ventilation Systems	20
UEPOPS310B	Operate Bulk Coal Handling Plant	40

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UEPOPS311B	Operate Fabric Filter Dust Collection Plant	20
UEPOPS312B	Operate and Monitor Fuel Supply	20
UEPOPS313B	Operate and Monitor Boiler Draught System	40
UEPOPS314B	Operate and Monitor Fuel Firing Plant (Gas or Oil)	40
UEPOPS315B	Operate and Monitor Fuel Firing Plant (Coal)	40
UEPOPS316B	Operate and Monitor Boiler Steam/Water Cycle	40
UEPOPS317B	Operate and Monitor Fixed Fire Protection Systems	30
UEPOPS318B	Operate and Monitor Compressed Gas Systems	30
UEPOPS319B	Operate and Monitor Gas Production Plant	30
UEPOPS320B	Operate and Monitor Compressed Air Systems	30
UEPOPS321B	Operate and Monitor Water Treatment Plant	30
UEPOPS322B	Operate and Monitor Alkalinity Reduction Plant	30
UEPOPS323B	Operate and Monitor Reverse Osmosis Plant	30
UEPOPS324B	Operate and Monitor Brine Concentrator Plant	30
UEPOPS325B	Operate and Monitor Water Quality Control Systems	30
UEPOPS326B	Operate and Monitor Oil Systems	30
UEPOPS327B	Monitor and Maintain Civil Assets	30
UEPOPS328B	Undertake Dam Safety Surveillance	30
UEPOPS329B	Operate and Monitor Auxiliary Steam Systems	40
UEPOPS330B	Operate and Monitor Heat Exchangers	40
UEPOPS331B	Operate and Monitor Water Systems (Condensate & Feedwater)	40
UEPOPS332B	Operate and Monitor Condensing and Cooling Water System	40
UEPOPS333B	Operate and Monitor H.R.S.G. Hot Gas Control System	40
UEPOPS334B	Operate and Monitor a Wind Generator	60

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UEPOPS335B	Operate A Hydro Generator/Synchronous Condenser / Pump Unit	60
UEPOPS336B	Manage Operate and Monitor a Gas Turbine Unit	60
UEPOPS337B	Maintain Quality Systems within the Team	20
UEPOPS338B	Facilitate Effective Workplace Communications	20
UEPOPS339B	Operate and Monitor a Boiler Unit	60
UEPOPS340B	Operate and Monitor a Steam Turbine	60
UEPOPS342B	Interpret and Analyse Single Operation Protection Devices	60
UEPOPS343B	Operate Hydro-Electric Generating Plant and Auxiliary Equipment	60
UEPOPS344B	Conduct Water Conveyance and Control	30
UEPOPS345B	Implement Dam Safety Surveillance Procedures	30
UEPOPS346B	Conduct Non-Routine Operational Testing	60
UEPOPS347B	Operate and Monitor Supervisory, Control and Data Acquisition Systems	40
UEPOPS349B	Operate H.V. Primary Switchgear	40
UEPOPS351B	Operate H.V. Condition Changing Apparatus	60
UEPOPS354B	Operate and Monitor Dual Fuel-Firing Plant	80
UEPOPS355B	Monitor the Implementation of Under Frequency Load Shedding	60
UEPOPS357B	Operate H.V. Secondary Switchgear	40
UEPOPS358A	Monitor and Maintain Wind Farm Civil Assets	40
UEPOPS359A	Monitor Climatic Conditions for Renewable Energy Production	40
UEPOPS360A	Operate and Monitor a Hydro Turbine	60
UEPOPS361A	Operate and Monitor Hydro Plant Auxiliary Systems	60
UEPOPS362A	Operate and Monitor Generator/Alternator	60

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UEPOPS368A	Operate manual systems	30
UEPOPS370A	Facilitate the use of contingency plans	60

Note:

1. Prerequisite pathways shall be identified and met for all elective units selected.

2. In selecting elective units considerations to career planning advice should be given to units that form part of a prerequisite pathway for the progression to achieve particular competencies or qualification at a higher level.

END OF QUALIFICATION

Custom Content Section

Not applicable.

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UEP40112 Certificate IV in ESI Generation - Systems Operations

Modification History

Release	Action	Core/Elective	Details	Points
2	Update	Group A	Correct unit Title TAEDEL301A Provide work skill instruction	40
3	Edit	Core	Correct weighting points of UEPOPS342B – Interpret and analyse single operation protection devices	60

Description

Scope: Those gaining this qualification will be able to complete work function such as remote operation of network equipment and isolation of plant and equipment for work, coordination of work activities, cost estimations, observation of safe working practices and environmental procedures. Supervision of others and coordination of work activities of individuals and/or team.

Pathways Information

Not applicable.

Licensing/Regulatory Information

Not applicable.

Entry Requirements

Not applicable.

Employability Skills Summary

Not applicable.

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Packaging Rules

Completion requirements:

The requirements for granting this qualification will be met when competency is demonstrated and achieved for:

- All the Core competency standard units, defined in the Core Competency Standard Units table below and
- A combination of Elective competency standard units to achieve a total weighting of 800 points in accordance with the Elective Competency Standard Units table below.

Core Competency Standard Units All core competency standard units to be achieved		**Weighting Points**
UEENEEE117A	Implement and monitor energy sector OHS policies and procedures	20
UEENEEE101A	Apply Occupational Health and Safety regulations, codes and practices in the workplace	20
UEPOPS202B	Apply Quality Systems to Work	20
UEPOPS301B	Conduct Single Energy Source Isolation Procedures for Permit to Work	40
UEPOPS337B	Maintain Quality Systems within the Team	20
UEPOPS342B	Interpret and Analyse Single Operation Protection Devices	60
UEPOPS347B	Operate and Monitor Supervisory, Control and Data Acquisition Systems	40
UEPOPS369A	Respond to a critical incident	40
UEPOPS417B	Monitor and Implement Environmental Plans and Procedures	20
UEPOPS420B	Coordinate the Network System	40
UEPOPS423B	Plan a Scheduled Outage	40
UEPOPS426B	Interpret and Analyse Multi-Operation Protection Devices	40
UEPOPS428B	Develop H.V Switching Programs	40

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UEPOPS439B	Plan and Organise Work	30
UEPOPS440B	Coordinate Team Activities	30
Total points in core		**500**

Elective Competency Standard Units Complete Elective units to achieve a total of weighting of 780 points from the following groups:			
Group		**Minimum points**	**Maximum points**
A	**Imported and Common Elective Units** Imported units from other training packages and/or state accredited courses can be added to this group, but they must be selected from qualifications where the unit is first packaged at AQF level 4. If units have not being assigned a weighting by the relevant EE-Oz Industry Technical Advisory Committee, their weighting will be 10 points.	0	220
B	**Qualification Elective Units** You may select units from this group for qualification completion.	0	700
C	**Qualification Elective Units** You may select all your elective units from this Group	100	780

Group A - Imported and Common Elective Units. Complete units to a maximum weighting of 220 points		**Weighting Points**
BSBCUS401B	Coordinate implementation of customer service strategies	40
BSBINM401A	Implement workplace information system	40
BSBINN301A	Promote Innovation in a team environment	40

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BSBLED401A	Develop teams and individuals	40
BSBMGT402A	Implement operational plan	40
BSBMGT403A	Implement continuous improvement	40
BSBWOR401A	Establish effective workplace relationships	50
BSBWOR402A	Promote team effectiveness	50
BSBWOR404B	Develop Work Priorities	40
MEM05004C	Perform routine oxy acetylene welding	20
MEM05007C	Perform manual heating and thermal cutting	20
MEM05012C	Perform routine manual metal arc welding	20
TAEDEL301A	Provide work skill instruction	40
UEENEEC005B	Estimate electrotechnology projects	40
UEENEEE124A	Compile and produce an energy sector detailed report	60
	Imported units from other training packages and/or state accredited courses can be added to this group, but they must be selected from qualifications where the unit is first packaged at AQF level 4. If units have not being assigned a weighting by the relevant EE-Oz Industry Technical Advisory Committee, their weighting will be 10 points. Note: For further information see Application of the NQC Flexibility Formula, Page 10, UEP12 ESI Generation Sector Training Package, Part1.1.00	Up to 220 points

Group B Qualification Electives. Complete units to a maximum weighting of 700 points		**Weighting Points**
UEPOPS203B	Operate and Monitor Communications Systems	20
UEPOPS252A	Undertake Local Systems Operations	30

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UEPOPS304B	Make and Spread a Stockpile	40
UEPOPS305B	Operate & Monitor Briquette Coal Cooling Plant	40
UEPOPS306B	Operate & Monitor Briquette Coal Drying Plant	40
UEPOPS307B	Operate & Monitor Briquette Coal Press Plant	40
UEPOPS308B	Perform Briquette Laboratory Tests	40
UEPOPS309B	Operate and Monitor Air Conditioning Equipment and Ventilation Systems	20
UEPOPS310B	Operate Bulk Coal Handling Plant	40
UEPOPS311B	Operate Fabric Filter Dust Collection Plant	20
UEPOPS312B	Operate and Monitor Fuel Supply	20
UEPOPS313B	Operate and Monitor Boiler Draught System	40
UEPOPS314B	Operate and Monitor Fuel Firing Plant (Gas or Oil)	40
UEPOPS315B	Operate and Monitor Fuel Firing Plant (Coal)	40
UEPOPS316B	Operate and Monitor Boiler Steam/Water Cycle	40
UEPOPS317B	Operate and Monitor Fixed Fire Protection Systems	30
UEPOPS318B	Operate and Monitor Compressed Gas Systems	30
UEPOPS319B	Operate and Monitor Gas Production Plant	30
UEPOPS320B	Operate and Monitor Compressed Air Systems	30
UEPOPS321B	Operate and Monitor Water Treatment Plant	30
UEPOPS322B	Operate and Monitor Alkalinity Reduction Plant	30
UEPOPS323B	Operate and Monitor Reverse Osmosis Plant	30
UEPOPS324B	Operate and Monitor Brine Concentrator Plant	30
UEPOPS325B	Operate and Monitor Water Quality Control Systems	30
UEPOPS326B	Operate and Monitor Oil Systems	30
UEPOPS327B	Monitor and Maintain Civil Assets	30

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UEPOPS328B	Undertake Dam Safety Surveillance	30
UEPOPS329B	Operate and Monitor Auxiliary Steam Systems	40
UEPOPS330B	Operate and Monitor Heat Exchangers	40
UEPOPS331B	Operate and Monitor Water Systems (Condensate & Feedwater)	40
UEPOPS332B	Operate and Monitor Condensing and Cooling Water System	40
UEPOPS333B	Operate and Monitor H.R.S.G. Hot Gas Control System	40
UEPOPS334B	Operate and Monitor a Wind Generator	60
UEPOPS335B	Operate A Hydro Generator/Synchronous Condenser / Pump Unit	60
UEPOPS336B	Manage Operate and Monitor a Gas Turbine Unit	60
UEPOPS338B	Facilitate Effective Workplace Communication	20
UEPOPS339B	Operate and Monitor a Boiler Unit	60
UEPOPS340B	Operate and Monitor a Steam Turbine	60
UEPOPS343B	Operate Hydro-Electric Generating Plant and Auxiliary Equipment	60
UEPOPS344B	Conduct Water Conveyance and Control	30
UEPOPS345B	Implement Dam Safety Surveillance Procedures	30
UEPOPS346B	Conduct Non-Routine Operational Testing	60
UEPOPS349B	Operate H.V. Primary Switchgear	40
UEPOPS351B	Operate H.V. Condition Changing Apparatus	60
UEPOPS352B	Conduct Operational Checks on In-Service Mechanical Plant	40
UEPOPS354B	Operate and Monitor Dual Fuel-Firing Plant	80
UEPOPS355B	Monitor the Implementation of Under Frequency Load Shedding	60

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UEPOPS356B	Apply Environmental and Sustainable Energy Procedures	20
UEPOPS357B	Operate H.V. Secondary Switchgear	40
UEPOPS358A	Monitor and Maintain Wind Farm Civil Assets	40
UEPOPS359A	Monitor Climatic Conditions for Renewable Energy Production	40
UEPOPS360A	Operate and Monitor a Hydro Turbine	60
UEPOPS361A	Operate and Monitor Hydro Plant Auxiliary Systems	60
UEPOPS362A	Operate and Monitor Generator/Alternator	60
UEPOPS364A	Ensure Compliance with Occupational Health and Safety policy and procedures	20
UEPOPS368A	Operate manual systems	30
UEPOPS370A	Facilitate the use of contingency plans	60
UEPOPS371A	Carry out operational checks on in-service electrical plant	40

Group C Qualification Electives. At least 100 points to be achieved from this group. You may select all your elective units from this Group		**Weighting Points**
UEPOPS402B	Conduct Multiple Energy Source Isolation Procedures for Permit to Work	40
UEPOPS403B	Coordinate Permit to Work System	40
UEPOPS404B	Coordinate First Response Team Operation	20
UEPOPS405B	Operate and Monitor AC Electrical Systems	30
UEPOPS406B	Operate and Monitor DC Electrical Systems	30
UEPOPS407B	Start and Run Up A Gas Turbine	60
UEPOPS408B	Shut Down a Gas Turbine	60
UEPOPS409B	Start-Up A Boiler Unit	60

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UEPOPS410B	Shut Down A Boiler Unit	60
UEPOPS411B	Run Up A Steam Turbine	60
UEPOPS412B	Undertake Operations Commissioning / Decommissioning	30
UEPOPS413B	Coordinate Operational Strategies for Power Production	20
UEPOPS414B	Perform Risk Analysis of Generation Plant	20
UEPOPS416B	Monitor the Implementation of the Enterprise's Production / Maintenance Quality Control procedures	20
UEPOPS419B	Shut down a steam turbine	60
UEPOPS422B	Schedule Generation	40
UEPOPS424B	Coordinate Local H.V. Networks	40
UEPOPS425B	Produce Maintenance Plans For Generation Production Plant	40
UEPOPS430B	Control Permit to Work Operations	40
UEPOPS431B	Collect and Analyse Hydrological and Meteorological Data	20
UEPOPS432B	Start up a Heat Recovery Steam Generator Unit	30
UEPOPS433B	Operate and Monitor a Heat Recovery Steam Generator Unit	20
UEPOPS434B	Shutdown an Heat Recovery Steam Generator Unit	30
UEPOPS435B	Operate and Monitor Flue Gas NOx Mitigation Systems	30
UEPOPS437B	Manage System Re-Start	40
UEPOPS441B	Operate and Monitor System Equipment	30
UEPOPS442B	Monitor and Co-ordinate the Operation of a Combined Cycle Gas Turbine Unit	60
UEPOPS443A	Coordinate Wind Farm Operations	40
UEPOPS444A	Start and Run-up a Hydro Turbine	60

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UEPOPS445A	Shut Down a Hydro Turbine	60
UEPOPS446A	Operate and monitor hydro unit control and protection systems	80
UEPOPS447A	Coordinate photovoltaic solar power plant operations	60
UEPOPS450A	Coordinate effective workplace communication	40
UEPOPS451A	Coordinate the use of contingency plans	40
UEPOPS452A	Conduct operational checks and carry out corrective action on in-service electrical plant	40
UEPOPS454A	Coordinate response to critical incidents	30
UEPOPS456A	Perform switching to a switching program	30
UEPOPS457A	Control electrical energy production	40

Note:

1. Prerequisite pathways shall be identified and met for all elective units selected.

2. In selecting elective units considerations to career planning advice should be given to units that form part of a prerequisite pathway for the progression to achieve particular competencies or qualification at a higher level.

END OF QUALIFICATION

Custom Content Section

Not applicable.

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UEP40212 Certificate IV in ESI Generation - Operations

Modification History

Release	Action	Core/Elective	Details	Points
2	Update	Group A	Correct unit Title TAEDEL301A Provide work skill instruction	40
3	Edit	Core	Correct weighting points of UEPOPS342B – Interpret and analyse single operation protection devices	60

Description

Scope: Those gaining this qualification will be able to complete work function such as remote operation of network equipment and isolation of plant and equipment for work, coordination of work activities, cost estimations, observation of safe working practices and environmental procedures. Supervision of others and coordination of work activities of individuals and/or team.

Pathways Information

Not applicable.

Licensing/Regulatory Information

Not applicable.

Entry Requirements

Not applicable.

Employability Skills Summary

Not applicable.

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Packaging Rules

Completion requirements:

The requirements for granting this qualification will be met when competency is demonstrated and achieved for:

- All the Core competency standard units, defined in the Core Competency Standard Units table below and
- A combination of Elective competency standard units to achieve a total weighting of 740 points in accordance with the Elective Competency Standard Units table below.

Core Competency Standard Units All core competency standard units to be achieved		**Weighting Points**
UEENEEE117A	Implement and monitor energy sector OHS policies and procedures	20
UEENEEE101A	Apply Occupational Health and Safety regulations, codes and practices in the workplace	20
UEPOPS202B	Apply Quality Systems to Work	20
UEPOPS252A	Undertake Local Systems Operations	30
UEPOPS301B	Conduct Single Energy Source Isolation Procedures for Permit to Work	40
UEPOPS337B	Maintain Quality Systems within the Team	20
UEPOPS342B	Interpret and Analyse Single Operation Protection Devices	60
UEPOPS347B	Operate and Monitor Supervisory, Control and Data Acquisition Systems	40
UEPOPS402B	Conduct Multiple Energy Source Isolation Procedures for procedures for a Permit to Work	40
UEPOPS403B	Coordinate Permit to Work System	40
UEPOPS405B	Operate and Monitor AC Electrical Systems	30
UEPOPS406B	Operate and Monitor DC Electrical Systems	30
UEPOPS417B	Monitor and Implement Environmental Plans and Procedures	20

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UEPOPS426B	Interpret and Analyse Multi-Operation Protection Devices	40
UEPOPS439B	Plan and Organise Work	30
UEPOPS440B	Coordinate Team Activities	30
UEPOPS454A	Coordinate Response to Critical Incidents	30
Total points in core		**540**

Elective Competency Standard Units Complete Elective units to achieve a total of weighting of 740 points from the following groups:			
Group		**Minimum points**	**Maximum points**
A	**Imported and Common Elective Units** Imported units from other training packages and/or state accredited courses can be added to this group, but they must be selected from qualifications where the unit is first packaged at AQF level 4. If units have not being assigned a weighting by the relevant EE-Oz Industry Technical Advisory Committee, their weighting will be 10 points.	0	220
B	**Qualification Elective Units** You may select units from this group for qualification completion.	0	620
C	**Qualification Elective Units** You may select all your elective units from this Group	140	740

Group A - Imported and Common Elective Units. Complete units to a maximum weighting of 220 points		**Weighting Points**
BSBCUS401B	Coordinate implementation of customer service strategies	40

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BSBINM401A	Implement workplace information system	40
BSBINN301A	Promote Innovation in a team environment	40
BSBLED401A	Develop teams and individuals	40
BSBMGT402A	Implement operational plan	40
BSBMGT403A	Implement continuous improvement	40
BSBWOR401A	Establish effective workplace relationships	50
BSBWOR402A	Promote team effectiveness	50
BSBWOR404B	Develop Work Priorities	40
TAEDEL301A	Provide work skill instruction	40
	Imported units from other training packages and/or state accredited courses can be added to this group, but they must be selected from qualifications where the unit is first packaged at AQF level 4. If units have not being assigned a weighting by the relevant EE-Oz Industry Technical Advisory Committee, their weighting will be 10 points. Note: For further information see Application of the NQC Flexibility Formula, Page 10, UEP12 ESI Generation Sector Training Package, Part1.1.00	Up to 220 points

Group B Qualification Electives. Complete units to a maximum weighting of 620 points		**Weighting Points**
UEPOPS203B	Operate and Monitor Communications Systems	20
UEPOPS304B	Make and Spread a Stockpile	40
UEPOPS305B	Operate & Monitor Briquette Coal Cooling Plant	40
UEPOPS306B	Operate & Monitor Briquette Coal Drying Plant	40
UEPOPS307B	Operate & Monitor Briquette Coal Press Plant	40
UEPOPS308B	Perform Briquette Laboratory Tests	40
UEPOPS309B	Operate and Monitor Air Conditioning Equipment and	20

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	Ventilation Systems	
UEPOPS310B	Operate Bulk Coal Handling Plant	40
UEPOPS311B	Operate Fabric Filter Dust Collection Plant	20
UEPOPS312B	Operate and Monitor Fuel Supply	20
UEPOPS313B	Operate and Monitor Boiler Draught System	40
UEPOPS314B	Operate and Monitor Fuel Firing Plant (Gas or Oil)	40
UEPOPS315B	Operate and Monitor Fuel Firing Plant (Coal)	40
UEPOPS316B	Operate and Monitor Boiler Steam/Water Cycle	40
UEPOPS317B	Operate and Monitor Fixed Fire Protection Systems	30
UEPOPS318B	Operate and Monitor Compressed Gas Systems	30
UEPOPS319B	Operate and Monitor Gas Production Plant	30
UEPOPS320B	Operate and Monitor Compressed Air Systems	30
UEPOPS321B	Operate and Monitor Water Treatment Plant	30
UEPOPS322B	Operate and Monitor Alkalinity Reduction Plant	30
UEPOPS323B	Operate and Monitor Reverse Osmosis Plant	30
UEPOPS324B	Operate and Monitor Brine Concentrator Plant	30
UEPOPS325B	Operate and Monitor Water Quality Control Systems	30
UEPOPS326B	Operate and Monitor Oil Systems	30
UEPOPS327B	Monitor and Maintain Civil Assets	30
UEPOPS328B	Undertake Dam Safety Surveillance	30
UEPOPS329B	Operate and Monitor Auxiliary Steam Systems	40
UEPOPS330B	Operate and Monitor Heat Exchangers	40
UEPOPS331B	Operate and Monitor Water Systems (Condensate & Feedwater)	40
UEPOPS332B	Operate and Monitor Condensing and Cooling Water System	40

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UEPOPS333B	Operate and Monitor H.R.S.G. Hot Gas Control System	40
UEPOPS334B	Operate and Monitor a Wind Generator	60
UEPOPS335B	Operate A Hydro Generator/Synchronous Condenser / Pump Unit	60
UEPOPS336B	Manage Operate and Monitor a Gas Turbine Unit	60
UEPOPS338B	Facilitate Effective Workplace Communication	20
UEPOPS339B	Operate and Monitor a Boiler Unit	60
UEPOPS340B	Operate and Monitor a Steam Turbine	60
UEPOPS343B	Operate Hydro-Electric Generating Plant and Auxiliary Equipment	60
UEPOPS344B	Conduct Water Conveyance and Control	30
UEPOPS345B	Implement Dam Safety Surveillance Procedures	30
UEPOPS346B	Conduct Non-Routine Operational Testing	60
UEPOPS349B	Operate H.V. Primary Switchgear	40
UEPOPS351B	Operate H.V. Condition Changing Apparatus	60
UEPOPS352B	Conduct Operational Checks on In-Service Mechanical Plant	40
UEPOPS354B	Operate and Monitor Dual Fuel-Firing Plant	80
UEPOPS355B	Monitor the Implementation of Under Frequency Load Shedding	60
UEPOPS356B	Apply Environmental and Sustainable Energy Procedures	20
UEPOPS357B	Operate H.V. Secondary Switchgear	40
UEPOPS358A	Monitor and Maintain Wind Farm Civil Assets	40
UEPOPS359A	Monitor Climatic Conditions for Renewable Energy Production	40
UEPOPS360A	Operate and Monitor a Hydro Turbine	60
UEPOPS361A	Operate and Monitor Hydro Plant Auxiliary Systems	60

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UEPOPS362A	Operate and Monitor Generator/Alternator	60
UEPOPS364A	Ensure Compliance with Occupational Health and Safety policy and procedures	20
UEPOPS368A	Operate manual systems	30
UEPOPS369A	Respond to a critical incident	40
UEPOPS370A	Facilitate the use of contingency plans	60
UEPOPS371A	Carry out operational checks on in-service electrical plant	40

Group C Qualification Electives. At least 140 points to be achieved from this group. You may select all your elective units from this Group		**Weighting Points**
UEPOPS404B	Coordinate First Response Team Operation	20
UEPOPS407B	Start and Run Up A Gas Turbine	60
UEPOPS408B	Shut Down a Gas Turbine	60
UEPOPS409B	Start-Up A Boiler Unit	60
UEPOPS410B	Shut Down A Boiler Unit	60
UEPOPS411B	Run Up A Steam Turbine	60
UEPOPS412B	Undertake Operations Commissioning / Decommissioning	30
UEPOPS413B	Coordinate Operational Strategies for Power Production	20
UEPOPS414B	Perform Risk Analysis of Generation Plant	20
UEPOPS416B	Monitor the Implementation of the Enterprise's Production / Maintenance Quality Control procedures	20
UEPOPS419B	Shut down a steam turbine	60
UEPOPS420B	Coordinate the Network/System	40
UEPOPS422B	Schedule Generation	40
UEPOPS423B	Plan a Scheduled Outage	40

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Group C Qualification Electives. At least 140 points to be achieved from this group. You may select all your elective units from this Group		**Weighting Points**
UEPOPS424B	Coordinate Local H.V. Networks	40
UEPOPS425B	Produce Maintenance Plans For Generation Production Plant	40
UEPOPS428B	Develop H.V. Switching Programs	40
UEPOPS430B	Control Permit to Work Operations	30
UEPOPS431B	Collect and Analyse Hydrological and Meteorological Data	20
UEPOPS432B	Start up a Heat Recovery Steam Generator Unit	30
UEPOPS433B	Operate and Monitor a Heat Recovery Steam Generator Unit	20
UEPOPS434B	Shutdown an Heat Recovery Steam Generator Unit	30
UEPOPS435B	Operate and Monitor Flue Gas NOx Mitigation Systems	30
UEPOPS437B	Manage System Re-Start	40
UEPOPS441B	Operate and Monitor System Equipment	30
UEPOPS442B	Monitor and Co-ordinate the Operation of a Combined Cycle Gas Turbine Unit	60
UEPOPS443A	Coordinate Wind Farm Operations	40
UEPOPS444A	Start and Run-up a Hydro Turbine	60
UEPOPS445A	Shut Down a Hydro Turbine	60
UEPOPS446A	Operate and monitor hydro unit control and protection systems	80
UEPOPS447A	Coordinate photovoltaic solar power plant operations	60
UEPOPS450A	Coordinate effective workplace communication	40
UEPOPS451A	Coordinate the use of contingency plans	40
UEPOPS452A	Conduct operational checks and carry out corrective action on in-service electrical plant	40

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Group C Qualification Electives. At least 140 points to be achieved from this group. You may select all your elective units from this Group		**Weighting Points**
UEPOPS456A	Perform switching to a switching program	30
UEPOPS457A	Control electrical energy production	40
UEPOPL001A	Licence to operate a steam turbine	60
UEPOPL002A	Licence to operate a reciprocating steam engine	60

Note:

1. Prerequisite pathways shall be identified and met for all elective units selected.

2. In selecting elective units considerations to career planning advice should be given to units that form part of a prerequisite pathway for the progression to achieve particular competencies or qualification at a higher level.

END OF QUALIFICATION

Custom Content Section

Not applicable.

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UEP40312 Certificate IV in ESI Generation Maintenance (Mechanical)

Modification History

Release	Action	Core/Elective	Details	Points
2	Update	Group A	Correct unit Title TAEDEL301A Provide work skill instruction	40
2	Update	Group A	CPCCCM2007B Use explosive power tool	15
3	Edit	Group C	Correct weighting points of UEPMNT419B – Perform civil drafting	60

Description

Scope: Those gaining this qualification will be able to complete power generation work function such as installation, repair and maintenance of plant and mechanical systems, maintenance planning and scheduling and observation of safe working practices and environmental procedures. Supervision of others and coordination of work activities of individuals and/or teams

Pathways Information

Not applicable.

Licensing/Regulatory Information

Not applicable.

Entry Requirements

Not applicable.

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Employability Skills Summary

Not applicable.

Packaging Rules

Completion requirements:

The requirements for granting this qualification will be met when competency is demonstrated and achieved for:

- All the Core competency standard units, defined in the Core Competency Standard Units table below and
- A combination of Elective competency standard units to achieve a total weighting of 510 points in accordance with the Elective Competency Standard Units table below.

Core Competency Standard Units All core competency standard units to be achieved		**Weighting Points**
MEM07005C	Perform general machining	80
MEM07006C	Perform lathe operations	40
MEM07007C	Perform milling operations	40
MEM07008D	Perform grinding operations	40
MEM09002B	Interpret technical drawing	40
MEM12003B	Perform precision mechanical measurement	20
MEM12023A	Perform Engineering Measurements	50
MEM12024A	Perform Computations	30
MEM18001C	Use hand tools	20
MEM18002B	Use power tools/hand held operations	20
MEM18003C	Use tools for precision work	40
MEM18006C	Repair and fit engineering components	60
MEM18007B	Maintain and repair mechanical drives and mechanical transmission assemblies	40
MEM18009B	Perform levelling and alignment of machines and engineering components	40

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MEM18055B	Dismantle, replace and assemble engineering components	30
UEENEEE117A	Implement and monitor energy sector OHS policies and procedures	20
UEENEEE101A	Apply Occupational Health and Safety regulations, codes and practices in the workplace	20
UEPOPS202B	Apply quality systems to work	20
UEPOPS337B	Maintain Quality Systems within the Team	20
UEPOPS338B	Facilitate Effective Workplace Communications	20
UEPOPS417B	Monitor and Implement Environmental Plans and Procedures	20
UEPOPS430B	Control permit to work operations	30
UEPOPS439B	Plan and Organise Work	30
Total points in core		**770**

Elective Competency Standard Units

Complete Elective units to achieve a total of weighting of 510 points from the following groups:

Group	**Minimum points**	**Maximum points**
A Imported and Common Elective Units Imported units from other training packages and/or state accredited courses can be added to this group, but they must be selected from qualifications where the unit is first packaged at AQF level 4. If units have not being assigned a weighting by the relevant EE-Oz Industry Technical Advisory Committee, their weighting will be 10 points.	0	220
B Qualification Electives You may select units from this group for qualification completion.	0	310
C Qualification Electives You may select all your elective units from this Group	200	510

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Group A - Imported and Common Elective Units. Complete units to a maximum weighting of 220 points		**Weighting Points**
BSBCUS401B	Coordinate implementation of customer service strategies	40
BSBINM401A	Implement workplace information system	40
BSBINN301A	Promote Innovation in a team environment	40
BSBLED401A	Develop teams and individuals	40
BSBMGT402A	Implement operational plan	40
BSBMGT403A	Implement continuous improvement	40
BSBWOR401A	Establish effective workplace relationships	50
BSBWOR402A	Promote team effectiveness	50
BSBWOR404B	Develop Work Priorities	40
CPCCCM2007B	Use Explosive Power Tools	15
CPCCLDG3001A	Licence to perform dogging	30
CPCCLRG3001A	License to Perform Rigging Basic Level	40
CPCCLRG3002A	Licence to Perform Rigging Intermediate Level	40
CPCCLSF2001A	License to Erect, Alter and Dismantle Scaffolding Basic Level	40
MEM09003B	Prepare basic engineering drawing	80
MEM09004B	Perform electrical/electronic detail drafting	80
MEM09005B	Perform basic engineering detail drafting	80
MEM09006B	Perform advanced engineering detail drafting	40
RIIHAN309A	Conduct Telescopic Materials Handler Operations	80

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TAEDEL301A	Provide work skill instruction	40
TLILIC0012A	License to operate a vehicle loading crane (Capacity 10 metre tonnes and above)	40
TLILIC2001A	Licence to operate a forklift truck	40
TLILIC2005A	License to Operate a Boom Type Elevating Work Platform (Boom Length 11 Metres or more)	30
TLILIC3006A	Licence to operate a non-slewing mobile crane (greater than 3 tonnes capacity)	60
	Imported units from other training packages and/or state accredited courses can be added to this group, but they must be selected from qualifications where the unit is first packaged at AQF level 4. If units have not being assigned a weighting by the relevant EE-Oz Industry Technical Advisory Committee, their weighting will be 10 points. Note: For further information see Application of the NQC Flexibility Formula, Page 10, UEP12 ESI Generation Sector Training Package, Part1.1.00	Up to 220 points

Group B Qualification Electives. Complete units to a maximum weighting of 310 points		**Weighting Points**
MEM05004C	Perform routine oxy acetylene welding	20
MEM05007C	Perform manual heating and thermal cutting	20
MEM05012C	Perform routine manual metal arc welding	20
MEM18010C	Perform equipment condition monitoring and recording	40
MEM18018C	Maintain pneumatic system components	40
MEM18020B	Maintain hydraulic system components	40
UEPMNT302B	Install and Maintain Industrial Pipework	40
UEPMNT303B	Maintain Mechanical Valves	40

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UEPMNT304B	Maintain Mechanical Pumps	40
UEPMNT305B	Maintain Industrial Fans	40
UEPMNT307B	Maintain Industrial Screens, Strainers and Filters	20
UEPMNT308B	Maintain Conveyors and Associated Equipment	40
UEPMNT309B	Maintain Material Feeders	40
UEPMNT310B	Maintain Material Crushers	40
UEPMNT311B	Maintain Fuel Transport Equipment	80
UEPMNT312B	Maintain Industrial Pressure Vessels	80
UEPMNT313B	Maintain Internal Combustion Engines	100
UEPMNT314B	Maintain Hydro Turbines	100
UEPMNT315B	Maintain Wind Turbines	100
UEPMNT317B	Diagnose and Repair Faults in Mechanical Equipment	40
UEPMNT318B	Conduct Generator Mechanical Maintenance	80
UEPMNT320B	Inspect and Repair/Replace Faults in Mechanical Equipment/Components	40
UEPMNT339B	Perform Sheet Metal Work	60
UEPMNT340B	Fabricate Metal Structures and Components	40
UEPMNT367A	Install and commission stationary gas fuelled reciprocating engines	60
UEPMNT368A	Repair and maintain stationary gas fuelled reciprocating engines	60
UEPOPS301B	Conduct Single Energy Source Isolation Procedures for Permit to Work	40

Group C Qualification Electives. At least 200 points to be achieved from this group. You may select all your elective units from this Group.		**Weighting Points**
UEPMNT401B	Install and Maintain Complex Mechanical Seals	40

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Group C Qualification Electives. At least 200 points to be achieved from this group. You may select all your elective units from this Group.		**Weighting Points**
UEPMNT402B	Conduct Complex Levelling and Alignment	40
UEPMNT403B	Maintain Complex Mechanical Valves	40
UEPMNT404B	Maintain Complex Mechanical Pumps	40
UEPMNT406B	Install and Maintain a Steam Turbine	100
UEPMNT407B	Install and Maintain a Gas Turbine	100
UEPMNT408B	Install Hydro Turbines	100
UEPMNT419B	Perform Civil Drafting	60
UEPMNT421B	Conduct Technical Inspections of Process Plant and Equipment	60
UEPMNT422B	Conduct Performance Testing on Process Plant and Equipment	60
UEPMNT424B	Monitor Efficiency of Thermal Steam Cycle Power Plant	60
UEPOPS402B	Conduct Multiple Energy Source Isolation Procedures for procedures for a Permit to Work	40
MEM07011B	Perform complex milling operations	40
MEM07012B	Perform complex grinding operations	40
MEM07021B	Perform complex lathe operations	40
MEM18019B	Maintain pneumatic systems	40
MEM18021B	Maintain hydraulic systems	40
MEM18022B	Maintain fluid power controls	80

Note:

1. Prerequisite pathways shall be identified and met for all elective units selected.

2. In selecting elective units considerations to career planning advice should be given to units that form part of a prerequisite pathway for the progression to achieve particular competencies or qualification at a higher level.

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END OF QUALIFICATION

Custom Content Section

Not applicable.

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UEP40412 Certificate IV in ESI Generation Maintenance (Fabrication)

Modification History

Release	Action	Core/Elective	Details	Points
2	Update	Core	Correct unit code MEM05024B Perform welding supervision	120
2	Update	Group A	Correct unit Title TAEDEL301A Provide work skill instruction	40
2	Update	Group A	CPCCCM2007B Use explosive power tool	15
3	Edit	Core	Correct weighting points of UEPOPS439B – Plan and organise work	30

Description

Scope: Those gaining this qualification will be able to complete power generation work function such as installation, fabrication repair and maintenance of industrial pressure vessels and associated pipe work, coded welding, coded welding, welding supervision, general fabrication. Observation of safe working practices and environmental procedures. Supervision of others and coordination of work activities of individuals and/or teams

Pathways Information

Not applicable.

Licensing/Regulatory Information

Not applicable.

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Entry Requirements

Not applicable.

Employability Skills Summary

Not applicable.

Packaging Rules

Completion requirements:

The requirements for granting this qualification will be met when competency is demonstrated and achieved for:

- All the Core competency standard units, defined in the Core Competency Standard Units table below and
- A combination of Elective competency standard units to achieve a total weighting of 520 points in accordance with the Elective Competency Standard Units table below.

Core Competency Standard Units All core competency standard units to be achieved		**Weighting Points**
MEM05007C	Perform manual heating and thermal cutting	20
MEM05012C	Perform routine manual metal arc welding	20
MEM05015D	Weld using manual metal arc welding process	40
MEM05016C	Perform advanced welding using manual metal arc welding process	40
MEM05017D	Weld using gas metal arc welding process	40
MEM05018C	Perform advanced welding using gas metal arc welding process	40
MEM05024B	Perform welding supervision	120
MEM05026C	Apply welding principles	40
MEM05050B	Perform routine gas metal arc welding	20
MEM05051A	Select welding processes	20
MEM05052A	Apply safe welding practices	40

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MEM09002B	Interpret technical drawing	40
MEM12023A	Perform Engineering Measurements	50
MEM18001C	Use hand tools	20
MEM18002B	Use power tools/hand held operations	20
UEENEEE101A	Apply Occupational Health and Safety regulations, codes and practices in the workplace	20
UEENEEE117A	Implement and monitor energy sector OHS policies and procedures	20
UEPMNT302B	Install and Maintain Industrial Pipework	40
UEPOPS202B	Apply quality systems to work	20
UEPOPS337B	Maintain Quality Systems within the Team	20
UEPOPS417B	Monitor and Implement Environmental Plans and Procedures	20
UEPOPS430B	Control permit to work operations	20
UEPOPS439B	Plan and Organise Work	30
Total points in core		**760**

Elective Competency Standard Units Complete Elective units to achieve a total of weighting of 530 points from the following groups:		
Group	**Minimum points**	**Maximum points**
A Imported and Common Elective Units Imported units from other training packages and/or state accredited courses can be added to this group, but they must be selected from qualifications where the unit is first packaged at AQF level 4. If units have not being assigned a weighting by the relevant EE-Oz Industry Technical Advisory Committee, their weighting will be 10 points.	0	220
B Qualification Electives You may select units from this group for qualification	0	410

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completion.		
C Qualification Electives You may select all your elective units from this Group	120	520

Group A - Imported and Common Elective Units Complete units to a maximum weighting of 220 points		**Weighting Points**
BSBCUS401B	Coordinate implementation of customer service strategies	40
BSBINM401A	Implement workplace information system	40
BSBINN301A	Promote Innovation in a team environment	40
BSBLED401A	Develop teams and individuals	40
BSBMGT402A	Implement operational plan	40
BSBMGT403A	Implement continuous improvement	40
BSBWOR401A	Establish effective workplace relationships	50
BSBWOR402A	Promote team effectiveness	50
BSBWOR404B	Develop Work Priorities	40
CPCCCM2007B	Use Explosive Power Tools	15
CPCCLDG3001A	Licence to perform dogging	30
CPCCLRG3001A	License to Perform Rigging Basic Level	40
CPCCLRG3002A	Licence to Perform Rigging Intermediate Level	40
CPCCLSF2001A	License to Erect, Alter and Dismantle Scaffolding Basic Level	40
RIIHAN309A	Conduct Telescopic Materials Handler Operations	80
TAEDEL301A	Provide work skill instruction	40
TLILIC2001A	Licence to operate a forklift truck	40
TLILIC0012A	License to operate a vehicle loading crane (Capacity	40

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	10 metre tonnes and above)	
TLILIC2005A	License to Operate a Boom Type Elevating Work Platform (Boom Length 11 Metres or more)	30
	Imported units from other training packages and/or state accredited courses can be added to this group, but they must be selected from qualifications where the unit is first packaged at AQF level 4. If units have not being assigned a weighting by the relevant EE-Oz Industry Technical Advisory Committee, their weighting will be 10 points. Note: For further information see Application of the NQC Flexibility Formula, Page 10, UEP12 ESI Generation Sector Training Package, Part1.1.00	Up to 220 points

Group B Qualification Electives. Complete units to a maximum weighting of 410 points		**Weighting Points**
UEPOPS338B	Facilitate Effective Workplace Communications	20
UEPMNT339B	Perform Sheet Metal Work	60
UEPMNT340B	Fabricate Metal Structures and Components	40
MEM05004C	Perform routine oxy acetylene welding	20
MEM05005B	Carry out mechanical cutting	20
MEM05011D	Assemble fabricated components	80
MEM05019D	Weld using gas tungsten arc welding process	40
MEM05036C	Repair/replace/modify fabrications	40
MEM05047B	Weld using flux core arc welding process	40
MEM05049B	Perform routine gas tungsten arc welding	20
MEM12007D	Mark off/out structural fabrications and shapes	40
MEM12024A	Perform Computations	30
UEPOPS301B	Conduct Single Energy Source Isolation Procedures for Permit to Work	40

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Group C Qualification Electives. At least 120 points to be achieved from this group. You may select all your elective units from this Group.		**Weighting Points**
UEPMNT421B	Conduct Technical Inspections of Process Plant and Equipment	60
UEPMNT422B	Conduct Performance Testing on Process Plant and Equipment	60
UEPMNT424B	Monitor Efficiency of Thermal Steam Cycle Power Plant	60
UEPOPS402B	Conduct Multiple Energy Source Isolation Procedures for procedures for a Permit to Work	40
MEM05020C	Perform advanced welding using gas tungsten arc welding process	40
MEM05022C	Perform advanced welding using oxy acetylene welding process	60
MEM05025C	Perform welding/fabrication inspection	120
MEM05042B	Perform welds to code standards using flux core arc welding process	60
MEM05043B	Perform welds to code standards using gas metal arc welding process	60
MEM05044B	Perform welds to code standards using gas tungsten arc welding process	60
MEM05045B	Perform pipe welds to code standards using manual metal arc welding process	60
MEM05046B	Perform welds to code standards using manual metal arc welding process	60
MEM05048B	Perform advanced welding using flux core arc welding process	40

Note:

1. Prerequisite pathways shall be identified and met for all elective units selected.

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2. In selecting elective units considerations to career planning advice should be given to units that form part of a prerequisite pathway for the progression to achieve particular competencies or qualification at a higher level.

END OF QUALIFICATION

Custom Content Section

Not applicable.

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UEP40512 Certificate IV in ESI Generation Maintenance - Electrical Electronics

Modification History

Release	Action	Core/Elective	Details	Points
3	Edit	Group C	Correct weighting points of UEPOPS439B – Plan and organise work	30

Description

Scope: This qualification provides competencies to manufacture, fit, assemble, erect, operate, test, fault find, alter, repair electrical equipment, electronic, instrumentation systems, and includes electrical wiring work only if that work is associated with assembling, maintaining, terminating or altering the wiring between electrical components within a power generating plant or machinery, maintenance planning and scheduling and supervision of others and coordination of work activities of individuals and/or teams.

Electrical equipment means any appliance, article, accessory, wire, fitting, cable, conduit or apparatus that generates, uses, conveys or controls (or that is intended to generate, use, convey or control) electricity above extra low voltage.

This qualification does not authorise the holder to install any electrical wiring systems within an electrical installation as prescribed by definitions contained in AS/NZS 3000.

Pathways Information

Not applicable.

Licensing/Regulatory Information

Not applicable.

Entry Requirements

Not applicable.

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Employability Skills Summary

Not applicable.

Packaging Rules

Completion requirements:

The requirements for granting this qualification will be met when competency is demonstrated and achieved for:

- All the Core competency standard units, defined in the Core Competency Standard Units table below and
- A combination of Elective competency standard units to achieve a total weighting of 460 points in accordance with the Elective Competency Standard Units table below.

Core Competency Standard Units All core competency standard units to be achieved		**Weighting Points**
UEENEEE101A	Apply Occupational Health and Safety regulations, codes and practices in the workplace	20
UEENEEE102A	Fabricate, dismantle, assemble utilities components	40
UEENEEE104A	Solve problems in d.c. circuits	80
UEENEEE105A	Fix and secure electrotechnology equipment	20
UEENEEE107A	Use drawings, diagrams, schedules, standards, codes and specifications	40
UEENEEE117A	Implement and monitor energy sector OHS policies and procedures	20
UEENEEE137A	Document and apply measures to control OHS risks associated with electrotechnology work	20
UEENEEG006A	Solve problems in single and three phase low voltage machines	80
UEENEEG033A	Solve problems in single and three phase low voltage electrical apparatus and circuits	60
UEENEEG063	Arrange circuits, control and protection for general	40

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A	electrical installations	
UEENEEG101A	Solve problems in electromagnetic devices and related circuits	60
UEENEEG102A	Solve problems in low voltage a.c circuits	80
UEENEEG106A	Terminate cables, cords and accessories for low voltage circuits	40
UEENEEG108A	Trouble-shoot and repair faults in low voltage electrical apparatus and circuits	40
UEENEEG109A	Develop and connect electrical control circuits	80
UEPOPS338B	Facilitate Effective Workplace Communications	20
UEPOPS371A	Carry out operational checks on in-service electrical plant	40
UEPOPS417B	Monitor and Implement Environmental Plans and Procedures	20
UEPOPS430B	Control permit to work operations	20
Total points in core		**820**

Elective Competency Standard Units

Complete Elective units to achieve a total of weighting of 460 points from the following groups:

Group		**Minimum points**	**Maximum points**
A	**Imported and Common Elective Units** Imported units from other training packages and/or state accredited courses can be added to this group, but they must be selected from qualifications where the unit is first packaged at AQF level 4. If units have not being assigned a weighting by the relevant EE-Oz Industry Technical Advisory Committee, their weighting will be 10 points.	0	220
B	**Qualification Electives**	0	220

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	You may select units from this group for qualification completion.		
C	**Qualification Electives** You may select all your elective units from this Group	240	460

Group A - Imported and Common Elective Units. Complete units to a maximum weighting of 220 points.		**Weighting Points**
UEENEEC001B	Maintain documentation	20
UEENEEC010B	Deliver a service to customers	20
UEENEED101A	Use basic computer applications relevant to a energy sector workplace	20
UEENEED104A	Use software for engineering applications	40
UEENEEE124A	Compile and produce an energy sector detailed report	60
BSBCUS401B	Coordinate implementation of customer service strategies	40
BSBINM401A	Implement workplace information system	40
BSBINN301A	Promote Innovation in a team environment	40
BSBLED401A	Develop teams and individuals	40
BSBMGT402A	Implement operational plan	40
BSBMGT403A	Implement continuous improvement	40
BSBWOR401A	Establish effective workplace relationships	50
BSBWOR402A	Promote team effectiveness	50
BSBWOR404B	Develop Work Priorities	40
TAEDEL301A	Provide work skill instruction	40
	Imported units from other training packages and/or state accredited courses can be added to this group, but they must be selected from qualifications where the unit is first packaged at AQF level 4. If units have not being assigned a weighting by the relevant EE-Oz	Up to 220 points

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	Industry Technical Advisory Committee, their weighting will be 10 points. Note: For further information see Application of the NQC Flexibility Formula, Page 10, UEP12 ESI Generation Sector Training Package, Part1.1.00	

Group B Qualification Electives. Complete units to a maximum weighting of 220 points.		**Weighting Points**
UEENEEF102A	Install and maintain cabling for multiple access to telecommunication services	120
UEENEEF105A	Install and modify optical fibre performance data communication cabling	40
UEENEEI101A	Use instrumentation drawings, specifications, standards and equipment manuals	40
UEENEEI107A	Install process instrumentation and tubing and control cabling	20
UEENEEI108A	Install process control apparatus and associated equipment	20
UEPMNT319B	Maintain and Test Fixed Fire Protection Systems	20
UEPMNT345B	Install electronic equipment	40
UEPMNT346B	Maintain electrical equipment	40
UEPMNT347B	Maintain complex electrical equipment	60
UEPMNT348B	Maintain electrical electronic equipment	40
UEPMNT350B	Modify electrical equipment	40
UEPMNT351B	Test and commission electrical equipment	40
UEPMNT352B	Test and commission electronic electrical equipment	40
UEPMNT355B	Install complex electronic/ instrumentation equipment	40
UEPMNT356B	Maintain instrumentation equipment	40
UEPMNT357B	Diagnose and repair faults in instrumentation	60

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	equipment	
UEPMNT358B	Modify instrumentation equipment	40
UEPMNT359B	Test and Commission Instrumentation Systems	40
UEPMNT362A	Maintain Wind Turbine Control Systems	60
UEPMNT366A	Maintain power plant inverter systems	60
UEPOPS202B	Apply Quality Systems To Work	20
UEPOPS301B	Conduct Single Energy Source Isolation Procedures for Permit to Work	40
UEPOPS337B	Maintain Quality Systems within the Team	20

Group C Qualification Electives. At least 240 points to be achieved from this group. You may select all your elective units from this Group		**Weighting Points**
UEENEEC005B	Estimate electrotechnology projects	40
UEPMNT410B	Diagnose and Repair Faults in Electronic Equipment	60
UEPMNT411B	Diagnose and Repair Faults in Complex Electrical Equipment	60
UEPMNT412B	Modify Complex Electrical Equipment	60
UEPMNT413B	Modify Electronic Electrical Equipment	60
UEPMNT414B	Test and Commission Complex Electrical Equipment	60
UEPMNT415B	Diagnose and Repair Faults in Complex Refrigeration / Air Conditioning Equipment	60
UEPMNT416B	Overhaul Electrical Generators	80
UEPMNT417B	Inspect Electrical Generators and Diagnose Faults	80
UEPMNT421B	Conduct Technical Inspection of Process Plant and Equipment	60
UEPMNT422B	Conduct Performance Testing on Process Plant and Equipment	60

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UEPMNT424B	Monitor Efficiency of Thermal Steam Cycle Power Plant	60
UEPMNT425B	Maintain Complex Instrumentation Equipment	80
UEPMNT426B	Maintain Electronic Instrumentation Equipment	80
UEPMNT427B	Diagnose and Repair Faults in Complex Instrumentation Equipment	80
UEPMNT428B	Modify Complex Instrumentation Equipment	80
UEPMNT429B	Modify Electronic Instrumentation Equipment	80
UEPMNT430B	Test and Commission Complex Instrumentation Equipment	80
UEPMNT431B	Test and Commission Electronic Instrumentation Equipment	80
UEPMNT432B	Write Programs for Control Systems	80
UEPMNT433B	Conduct Routine Generation Electrical Maintenance	60
UEPMNT434A	Diagnose and Repair Faults in Wind Turbine Control Systems	80
UEPMNT436A	Test and Commission Wind Turbine Control Systems	80
UEPMNT440A	Diagnose and repair faults in power plant inverter systems	60
UEPMNT441A	Test and commission power plant inverter systems	60
UEPOPS402B	Conduct Multiple Energy Source Isolation Procedures for procedures for a Permit to Work	40
UEPOPS439B	Plan and Organise Work	30

Note:

1. Prerequisite pathways shall be identified and met for all elective units selected.

2. In selecting elective units considerations to career planning advice should be given to units that form part of a prerequisite pathway for the progression to achieve particular competencies or qualification at a higher level.

END OF QUALIFICATION

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Custom Content Section

Not applicable.

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UEP40612 Certificate IV in Large Scale Wind Generation - Electrical

Modification History

Not applicable.

Description

Scope

This qualification provides competencies to operate, test, fault find, alter, repair electrical equipment and systems associated with large scale wind power generation. It includes the requirements for an ‘Electrical Fitter licence’.

Pathways Information

Not applicable.

Licensing/Regulatory Information

This qualifications include the requirements for an "Electrical Fitter Licence".

Entry Requirements

Not applicable.

Employability Skills Summary

Not applicable.

Packaging Rules

Completion requirements

- The requirements for granting this qualification will be met when competency is demonstrated and achieved for:
-
- All the Core competency standard units, defined in the Core Competency Standard Units table below and

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- A combination of Elective competency standard units to achieve a total weighting of 380 points in accordance with the Elective Competency Standard Units table below.

Core Competency Standard Units All Core competency standard units to be achieved		**Weighting Points**
UEENEEE101A	Apply Occupational Health Safety regulations, codes and practices in the workplace	20
UEENEEE102A	Fabricate, dismantle, assemble utilities components	40
UEENEEE104A	Solve problems in d.c. circuits	80
UEENEEE105A	Fix and secure electrotechnology equipment	20
UEENEEE107A	Use drawings, diagrams, schedules, standards, codes and specifications	40
UEENEEE117A	Implement and monitor energy sector OHS policies and procedures	20
UEENEEE185A	Write work activity reports	20
UEENEEE137A	Document and apply measures to control OHS risks associated with electrotechnology work	20
UEENEEE038B	Participate in competency development and follow a personal development plan	20
UEENEEG006A	Solve problems in single and three phase low voltage machines	80
UEENEEG033A	Solve problems in single and three phase low voltage electrical apparatus and circuits	60
UEENEEG063A	Arrange circuits, control and protection for general electrical installations	40
UEENEEG101A	Solve problems in electromagnetic devices and related circuits	60
UEENEEG102A	Solve problems in low voltage a.c. circuits	80
UEENEEG106A	Terminate cables, cords and accessories for low voltage circuits	40
UEENEEG108A	Trouble-shoot and repair faults in low voltage electrical	40

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Core Competency Standard Units All Core competency standard units to be achieved		**Weighting Points**
	apparatus and circuits	
UEENEEG109A	Develop and connect electrical control circuits	80
UEENEEG199A	Conduct compliance and functional verification of electrical apparatus and existing circuits	40
UEENEEK145A	Implement and monitor energy sector policies and procedures for environmental and sustainable work practices	20
UEPMNT202A	Carry out routine work activities in an ESI large scale wind generation environment	20
UEPMNT371A	Maintain large scale wind turbine generators	60
Total points in core		**900**

Elective Competency Standard Units Complete Elective units to achieve a total of weighting of 380 points from the following groups:			
Group		**Minimum points**	**Maximum points**
A	**Imported and Common Elective Units** Imported units from other training packages and/or state accredited courses can be added to this group, but they must be selected from qualifications where the unit is first packaged at AQF level 4. If units have not being assigned a weighting in the ESI – Power Generation Training Package, their weighting will be 10 points.	0	60
B	**Qualification Electives Units**	0	120
C	**Qualification Electives Units** You may select all your elective units from this Group	260	380

Group A – Imported and Common Elective Units	**Weighting**

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You may complete units to a maximum weighting of 60		**Points**
UEENEEC001B	Maintain documentation	20
UEENEEC010B	Deliver a service to customers	20
UEENEED101A	Use computer applications relevant to a workplace	20
UEENEEE009B	Comply with scheduled and preventative maintenance program processes	20
	Imported units from other training packages and/or state accredited courses can be added to this group, but they must be selected from qualifications where the unit is first packaged at AQF level 4. If units have not being assigned a weighting in the ESI Power Generation Training Package, their weighting will be 10 points. Note: For further information see Transition to NQC Packaging Rules for Flexibility, Page 10, UEP12 ESI Power Generation Training Package, Version 2, Part 1.1.00 Preliminary Information.	Up to 60 points

Group B – Qualification Elective Units You may complete units to a maximum weighting of 120		**Weighting Points**
UEENEED104A	Use engineering applications software	40
UEENEEI116A	Enter and verify operating instructions in microprocessor equipped devices	20
UEENEEI150A	Develop, enter and verify discrete control programs for programmable controllers	60
UEENEEF102A	Install and maintain cabling for multiple access to telecommunication services	120
UEENEEF104A	Install and modify performance data communication copper cabling	40
UEENEEF107A	Set up and configure the wireless capabilities of communications and data storage devices	40
UEENEEF108A	Select and arrange equipment for wireless communication networks	40

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UEENEEF111A	Test, report and rectify faults in voice and data installations	40
UEENEEG110A	Find and repair faults in LV d.c. electrical apparatus and circuits	60
UEENEEG111A	Carry out basic repairs to electrical components and equipment	40
UEENEEG116A	Diagnose and rectify faults in traction lift systems	80
UEENEEG129A	Overhaul and repair major switchgear and controlgear	60
UEENEEG157A	Conduct electrical tests on LV electrical machines	40
UEENEEG159A	Conduct mechanical tests of LV electrical machines	40
UEENEEG164A	Repair and maintain mechanical components of electrical machines	40
UEENEEG165A	Maintain and service traction lifts systems and equipment	40
UEENEEH102A	Repair basic electronic apparatus faults by replacement of components	40
UEENEEH111A	Troubleshoot single phase input d.c. power supplies	40
UEENEEI101A	Use instrumentation drawings, specifications, standards and equipment manuals	40
UEENEEK142A	Apply environmental and sustainable procedures in the energy sector	20
UETTDRIS44A	Perform high voltage field switching operation to a given schedule	40
UETTDREL16A	Working safely near live electrical apparatus	20
UEPOPS301B	Conduct Single Energy Source Isolation Procedures for Permit to Work	40
UEPOPS349B	Operate Local H.V. switchgear	40
UEPMNT369A	Monitor Climatic Conditions for Renewable Energy Power Generation	40

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UEPMNT370A	Maintain and monitor wind farm civil assets	40

Group C – Qualification Elective Units You must complete at least 260 weighting points from this group. You may select all your elective units from this Group		**Weighting Points**
UEPMNT442A	Maintain wind turbine generator electrical systems	60
UEPMNT443A	Maintain wind turbine generator control systems	60
UEPMNT444A	Maintain wind turbine generator mechanical systems	60
UEPMNT445A	Diagnose and repair faults in large scale wind turbine generators	60
UEPMNT446A	Coordinate maintenance on a wind farm	60
UEPMNT447A	Diagnose and repair faults in wind turbine generator electrical systems	60
UEPMNT448A	Diagnose and repair faults in wind turbine generator control systems	60
UEPMNT449A	Diagnose and repair mechanical systems faults in wind turbine generators	60
UEPMNT450A	Test and commission wind turbine generators	60
UEPOPS402B	Conduct Multiple Energy Source Isolation Procedures for procedures for a Permit to Work	40
UEPOPS424B	Coordinate local HV networks	30
UEPOPS428B	Develop HV switching programs	20
UEPOPS456A	Perform switching to a switching program	30

Note:

1. Prerequisite pathways shall be identified and met for all elective units selected.

2. In selecting elective units considerations to career planning advice should be given to units that form part of a prerequisite pathway for the progression to achieve particular competencies or qualification at a higher level.

END OF QUALIFICATION

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Custom Content Section

Not applicable.

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UEP50112 Diploma of ESI Generation - Systems Operations

Modification History

Release	Action	Core/Elective	Details	Points
2	Update	Group A	BSBWHS501A Ensure a safe workplace	60
3	Edit	Group B	Correct weighting points of UEPOPS342B – Interpret and analyse single operation protection devices	60

Description

Scope: Those gaining this qualification will be able to complete work function such as remote operation of network systems. Isolation of plant systems for work. Development of operational procedures and systems, manage the start up and shut down of boilers and turbines, hydro plant, gas turbines. Implementation of safe working practices and environmental procedures. Management and supervision of others and coordination of work activities of individuals and/or teams.

Pathways Information

Not applicable.

Licensing/Regulatory Information

Not applicable.

Entry Requirements

Not applicable.

Employability Skills Summary

Not applicable.

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Packaging Rules

Completion requirements:

The requirements for granting this qualification will be met when competency is demonstrated and achieved for:

- All the Core competency standard units, defined in the Core Competency Standard Units table below and
- A combination of Elective competency standard units to achieve a total weighting of 960 points in accordance with the Elective Competency Standard Units table below.

Core Competency Standard Units All core competency standard units to be achieved		**Weighting Points**
UEENEEE117A	Implement and monitor energy sector OHS policies and procedures	20
UEENEEE101A	Apply Occupational Health and Safety regulations, codes and practices in the workplace	20
UEPOPS202B	Apply Quality Systems to Work	20
UEPOPS337B	Maintain Quality Systems within the Team	20
UEPOPS369A	Respond to a critical incident	40
UEPOPS370A	Facilitate the use of contingency plans	60
UEPOPS417B	Monitor and Implement Environmental Plans and Procedures	20
UEPOPS420B	Coordinate the Network System	40
UEPOPS426B	Interpret and Analyse Multi-Operation Protection Devices	40
UEPOPS428B	Develop H.V Switching Programs	20
UEPOPS440B	Coordinate Team Activities	30
UEPOPS441B	Operate and Monitor System Equipment	30
UEPOPS454A	Coordinate response to critical incidents	30
UEPOPS456A	Perform switching to a switching program	30
UEPOPS501B	Manage Occupational Health and Safety Policy and	40

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	Procedures	
UEPOPS512B	Manage the Network/Systems	80
UEPOPS513B	Manage Operational Crisis to Maintain/Restore Power System Integrity	60
UEPOPS515B	Coordinate Power Generation	40
Total points in core		**640**

Elective Competency Standard Units

Complete Elective units to achieve a total of weighting of 960 points from the following groups:

Group		**Minimum points**	**Maximum points**
A	**Imported and Common Elective Units** Imported units from other training packages and/or state accredited courses can be added to this group, but they must be selected from qualifications where the unit is first packaged at AQF level 5. If units have not being assigned a weighting by the relevant EE-Oz Industry Technical Advisory Committee, their weighting will be 10 points.	0	270
B	**Qualification Elective Units** You may select units from this group for qualification completion.	0	660
C	**Qualification Elective Units** You may select units from this group for qualification completion.	0	100
D	**Qualification Elective Units** You may select units from this group for qualification completion.	200	920

Group A - Imported and Common Elective Units.	**Weighting**

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Complete units to a maximum weighting of 270 points		**Points**
BSBCUS501C	Manage quality customer service	40
BSBINM501A	Manage an information or knowledge management system	50
BSBINN502A	Build and sustain an innovative work environment	50
BSBLED501A	Develop a workplace learning environment	60
BSBMGT502B	Manage people performance	70
BSBMGT515A	Manage operational plan	60
BSBMGT516C	Facilitate continuous improvement	60
BSBWHS501A	Ensure a Safe Workplace	60
BSBWOR501B	Manage personal work priorities and professional development	60
BSBWOR502B	Ensure team effectiveness	60
	Imported units from other training packages and/or state accredited courses can be added to this group, but they must be selected from qualifications where the unit is first packaged at AQF level 5. If units have not being assigned a weighting by the relevant EE-Oz Industry Technical Advisory Committee, their weighting will be 10 points. Note: For further information see Application of the NQC Flexibility Formula, Page 10, UEP12 ESI Generation Sector Training Package, Part1.1.00	Up to 270 points

Group B Qualification Electives. Complete units to a maximum weighting of 660 points		**Weighting Points**
UEPOPS301B	Conduct Single Energy Source Isolation Procedures for Permit to Work	40
UEPOPS304B	Make and Spread a Stockpile	40

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UEPOPS305B	Operate & Monitor Briquette Coal Cooling Plant	40
UEPOPS306B	Operate & Monitor Briquette Coal Drying Plant	40
UEPOPS307B	Operate & Monitor Briquette Coal Press Plant	40
UEPOPS308B	Perform Briquette Laboratory Tests	40
UEPOPS309B	Operate and Monitor Air Conditioning Equipment and Ventilation Systems	20
UEPOPS310B	Operate Bulk Coal Handling Plant	40
UEPOPS311B	Operate Fabric Filter Dust Collection Plant	20
UEPOPS312B	Operate and Monitor Fuel Supply	20
UEPOPS313B	Operate and Monitor Boiler Draught System	40
UEPOPS314B	Operate and Monitor Fuel Firing Plant (Gas or Oil)	40
UEPOPS315B	Operate and Monitor Fuel Firing Plant (Coal)	40
UEPOPS316B	Operate and Monitor Boiler Steam/Water Cycle	40
UEPOPS317B	Operate and Monitor Fixed Fire Protection Systems	30
UEPOPS318B	Operate and Monitor Compressed Gas Systems	30
UEPOPS319B	Operate and Monitor Gas Production Plant	30
UEPOPS320B	Operate and Monitor Compressed Air Systems	30
UEPOPS321B	Operate and Monitor Water Treatment Plant	30
UEPOPS322B	Operate and Monitor Alkalinity Reduction Plant	30
UEPOPS323B	Operate and Monitor Reverse Osmosis Plant	30
UEPOPS324B	Operate and Monitor Brine Concentrator Plant	30
UEPOPS325B	Operate and Monitor Water Quality Control Systems	30
UEPOPS326B	Operate and Monitor Oil Systems	30
UEPOPS327B	Monitor and Maintain Civil Assets	30
UEPOPS328B	Undertake Dam Safety Surveillance	30

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UEPOPS329B	Operate and Monitor Auxiliary Steam Systems	40
UEPOPS330B	Operate and Monitor Heat Exchangers	40
UEPOPS331B	Operate and Monitor Water Systems (Condensate & Feedwater)	40
UEPOPS332B	Operate and Monitor Condensing and Cooling Water System	40
UEPOPS333B	Operate and Monitor H.R.S.G. Hot Gas Control System	40
UEPOPS334B	Operate and Monitor a Wind Generator	60
UEPOPS335B	Operate A Hydro Generator/Synchronous Condenser / Pump Unit	60
UEPOPS336B	Manage Operate and Monitor a Gas Turbine Unit	60
UEPOPS338B	Facilitate Effective Workplace Communication	20
UEPOPS339B	Operate and Monitor a Boiler Unit	60
UEPOPS340B	Operate and Monitor a Steam Turbine	60
UEPOPS342B	Interpret and Analyse Single Operation Protection Devices	60
UEPOPS343B	Operate Hydro-Electric Generating Plant and Auxiliary Equipment	60
UEPOPS344B	Conduct Water Conveyance and Control	30
UEPOPS345B	Implement Dam Safety Surveillance Procedures	30
UEPOPS346B	Conduct Non-Routine Operational Testing	60
UEPOPS347B	Operate and Monitor Supervisory, Control and Data Acquisition Systems	40
UEPOPS349B	Operate H.V. Primary Switchgear	40
UEPOPS351B	Operate H.V. Condition Changing Apparatus	60
UEPOPS352B	Conduct Operational Checks on In-Service Mechanical Plant	40
UEPOPS354B	Operate and Monitor Dual Fuel-Firing Plant	80

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UEPOPS355B	Monitor the Implementation of Under Frequency Load Shedding	60
UEPOPS356B	Apply Environmental and Sustainable Energy Procedures	20
UEPOPS357B	Operate H.V. Secondary Switchgear	40
UEPOPS358A	Monitor and Maintain Wind Farm Civil Assets	40
UEPOPS359A	Monitor Climatic Conditions for Renewable Energy Production	40
UEPOPS360A	Operate and Monitor a Hydro Turbine	60
UEPOPS361A	Operate and Monitor Hydro Plant Auxiliary Systems	60
UEPOPS362A	Operate and Monitor Generator/Alternator	60
UEPOPS364A	Ensure Compliance with Occupational Health and Safety policy and procedures	20
UEPOPS368A	Operate manual systems	30
UEPOPS371A	Carry out operational checks on in-service electrical plant	40

Group C Qualification Electives Complete units to a maximum weighting of 100 points		**Weighting Points**
UEENEEC005B	Estimate electrotechnology projects	40
UEPOPS402B	Conduct Multiple Energy Source Isolation Procedures for Permit to Work	40
UEPOPS403B	Coordinate Permit to Work System	40
UEPOPS404B	Coordinate First Response Team Operation	20
UEPOPS405B	Operate and Monitor AC Electrical Systems	30
UEPOPS406B	Operate and Monitor DC Electrical Systems	30
UEPOPS407B	Start and Run Up A Gas Turbine	60
UEPOPS408B	Shut Down a Gas Turbine	60

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UEPOPS409B	Start-Up A Boiler Unit	60
UEPOPS410B	Shut Down A Boiler Unit	60
UEPOPS411B	Run Up A Steam Turbine	60
UEPOPS412B	Undertake Operations Commissioning / Decommissioning	30
UEPOPS413B	Coordinate Operational Strategies for Power Production	20
UEPOPS414B	Perform Risk Analysis of Generation Plant	20
UEPOPS416B	Monitor the Implementation of the Enterprise's Production / Maintenance Quality Control procedures	20
UEPOPS419B	Shut down a steam turbine	60
UEPOPS422B	Schedule Generation	40
UEPOPS423B	Plan a Scheduled Outage	40
UEPOPS424B	Coordinate Local H.V. Networks	40
UEPOPS425B	Produce Maintenance Plans For Generation Production Plant	40
UEPOPS430B	Control Permit to Work Operations	30
UEPOPS431B	Collect and Analyse Hydrological and Meteorological Data	20
UEPOPS432B	Start up a Heat Recovery Steam Generator Unit	30
UEPOPS433B	Operate and Monitor a Heat Recovery Steam Generator Unit	20
UEPOPS434B	Shutdown an Heat Recovery Steam Generator Unit	30
UEPOPS435B	Operate and Monitor Flue Gas NOx Mitigation Systems	30
UEPOPS437B	Manage System Re-Start	40
UEPOPS439B	Plan and Organise Work	30
UEPOPS442B	Monitor and Co-ordinate the Operation of a Combined Cycle Gas Turbine Unit	60
UEPOPS443A	Coordinate Wind Farm Operations	40

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UEPOPS444A	Start and Run-up a Hydro Turbine	60
UEPOPS445A	Shut Down a Hydro Turbine	60
UEPOPS446A	Operate and monitor hydro unit control and protection systems	80
UEPOPS447A	Coordinate photovoltaic solar power plant operations	60
UEPOPS450A	Coordinate effective workplace communication	40
UEPOPS451A	Coordinate the use of contingency plans	40
UEPOPS452A	Conduct operational checks and carry out corrective action on in-service electrical plant	40
UEPOPS457A	Control electrical energy production	40

Group D Qualification Electives You must complete units to a minimum weighting of 200. You may select units to a maximum weighting of 920.		**Weighting Points**
UEPOPS502B	Manage Permit to Work System	40
UEPOPS505B	Produce maintenance strategies for generation production plant	80
UEPOPS507B	Conduct project management	60
UEPOPS508B	Manage commissioning/ decommissioning	80
UEPOPS509B	Manage quality control procedures	40
UEPOPS510B	Monitor power generation plant reliability	60
UEPOPS511B	Tune Process Plant and Equipment	60
UEPOPS514B	Control hydro generation/pumping	60
UEPOPS520A	Evaluate cost estimations and initiate appropriate solutions	40
UEPOPS523A	Manage critical incidents	60
UEPOPS524A	Evaluate the scheduling of generation	60

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UEPOPS525A	Coordinate and direct switching program	60
UEPOPS526A	Coordinate electrical energy production	60
UEPOPS527A	Manage first response team	40
UEPOPS528A	Manage environmental management systems	40
UEPOPS529A	Manage operational strategies for power production	80

Note:

1. Prerequisite pathways shall be identified and met for all elective units selected.

2. In selecting elective units considerations to career planning advice should be given to units that form part of a prerequisite pathway for the progression to achieve particular competencies or qualification at a higher level.

END OF QUALIFICATION

Custom Content Section

Not applicable.

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UEP50212 Diploma of ESI Generation (Operations)

Modification History

Release	Action	Core/Elective	Details	Points
2	Update	Group A	BSBWHS501A Ensure a safe workplace	60
2	Update	Group A	Update to the latest release LGAWORK404A – Manage a civil works project	80

Description

Scope: Those gaining this qualification will be able to complete work function such as development of operational procedures and systems, manage the start up and shut down of boilers and turbines, hydro plant, gas turbines. Implementation of safe working practices and environmental procedures. Management and supervision of others and coordination of work activities of individuals and/or teams.

Pathways Information

Not applicable.

Licensing/Regulatory Information

Not applicable.

Entry Requirements

Not applicable.

Employability Skills Summary

Not applicable.

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Packaging Rules

Completion requirements:

The requirements for granting this qualification will be met when competency is demonstrated and achieved for:

- All the Core competency standard units, defined in the Core Competency Standard Units table below and
- A combination of Elective Competency Standard Units to achieve a total weighting of 910 points in accordance with the Elective Competency Standard Units table below.

Core Competency Standard Units All core competency standard units to be achieved		**Weighting Points**
UEENEEE117A	Implement and monitor energy sector OHS policies and procedures	20
UEENEEE101A	Apply Occupational Health and Safety regulations, codes and practices in the workplace	20
UEPOPS202B	Apply Quality Systems to Work	20
UEPOPS337B	Maintain Quality Systems within the Team	20
UEPOPS301B	Conduct Single Energy Source Isolation Procedures for procedures for a Permit to Work	40
UEPOPS402B	Conduct Multiple Energy Source Isolation Procedures for procedures for a Permit to Work	40
UEPOPS403B	Coordinate Permit to Work System	40
UEPOPS405B	Operate and Monitor AC Electrical Systems	30
UEPOPS406B	Operate and Monitor DC Electrical Systems	30
UEPOPS417B	Monitor and Implement Environmental Plans and Procedures	20
UEPOPS342B	Interpret and Analyse Single Operation Protection Devices	60

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UEPOPS426B	Interpret and Analyse Multi-Operation Protection Devices	40
UEPOPS439B	Plan and Organise Work	30
UEPOPS440B	Coordinate Team Activities	30
UEPOPS454A	Coordinate response to critical incidents	30
UEPOPS457A	Control electrical energy production	40
UEPOPS501B	Manage Occupational Health and Safety Policy and Procedures	40
UEPOPS502B	Manage Permit to Work System	40
UEPOPS509B	Manage Quality Control Procedures	40
UEPOPS513B	Manage Operational Crisis to Maintain/Restore Power System Integrity	60
Total points in core		**690**

Elective Competency Standard Units

Complete Elective units to achieve a total of weighting of 910 points from the following groups:

Group		**Minimum points**	**Maximum points**
A	**Imported and Common Elective Units** Imported units from other training packages and/or state accredited courses can be added to this group, but they must be selected from qualifications where the unit is first packaged at AQF level 5. If units have not being assigned a weighting by the relevant EE-Oz Industry Technical Advisory Committee, their weighting will be 10 points.	0	270
B	**Qualification Electives** You may select units from this group for qualification completion.	0	490
C	**Qualification Electives**	0	180

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	You may select units from this group for qualification completion.		
D	**Qualification Electives** You may select all your elective units from this Group	240	910

Group A - Imported and Common Elective Units. Complete units to a maximum weighting of 270 points		**Weighting Points**
BSBCUS501C	Manage quality customer service	40
BSBINM501A	Manage an information or knowledge management system	50
BSBINN502A	Build and sustain an innovative work environment	50
BSBLED501A	Develop a workplace learning environment	60
BSBMGT502B	Manage people performance	70
BSBMGT515A	Manage operational plan	60
BSBMGT516C	Facilitate continuous improvement	60
BSBWHS501A	Ensure a Safe Workplace	60
BSBWOR501B	Manage personal work priorities and professional development	60
BSBWOR502B	Ensure team effectiveness	60
LGAWORK404A	Manage a civil works project	80
	Imported units from other training packages and/or state accredited courses can be added to this group, but they must be selected from qualifications where the unit is first packaged at AQF level 5. If units have not being assigned a weighting by the relevant EE-Oz Industry Technical Advisory Committee, their weighting will be 10 points. Note: For further information see Application of the NQC Flexibility Formula, Page 10, UEP12 ESI	Up to 270 points

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	Generation Sector Training Package, Part1.1.00	

Group B Qualification Electives. Complete units to a maximum weighting of 490 points		**Weighting Points**
UEPOPS304B	Make and Spread a Stockpile	40
UEPOPS305B	Operate & Monitor Briquette Coal Cooling Plant	40
UEPOPS306B	Operate & Monitor Briquette Coal Drying Plant	40
UEPOPS307B	Operate & Monitor Briquette Coal Press Plant	40
UEPOPS308B	Perform Briquette Laboratory Tests	40
UEPOPS309B	Operate and Monitor Air Conditioning Equipment and Ventilation Systems	20
UEPOPS310B	Operate Bulk Coal Handling Plant	40
UEPOPS311B	Operate Fabric Filter Dust Collection Plant	20
UEPOPS312B	Operate and Monitor Fuel Supply	20
UEPOPS313B	Operate and Monitor Boiler Draught System	40
UEPOPS314B	Operate and Monitor Fuel Firing Plant (Gas or Oil)	40
UEPOPS315B	Operate and Monitor Fuel Firing Plant (Coal)	40
UEPOPS316B	Operate and Monitor Boiler Steam/Water Cycle	40
UEPOPS317B	Operate and Monitor Fixed Fire Protection Systems	30
UEPOPS318B	Operate and Monitor Compressed Gas Systems	30
UEPOPS319B	Operate and Monitor Gas Production Plant	30
UEPOPS320B	Operate and Monitor Compressed Air Systems	30
UEPOPS321B	Operate and Monitor Water Treatment Plant	30
UEPOPS322B	Operate and Monitor Alkalinity Reduction Plant	30
UEPOPS323B	Operate and Monitor Reverse Osmosis Plant	30
UEPOPS324B	Operate and Monitor Brine Concentrator Plant	30

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UEPOPS325B	Operate and Monitor Water Quality Control Systems	30
UEPOPS326B	Operate and Monitor Oil Systems	30
UEPOPS327B	Monitor and Maintain Civil Assets	30
UEPOPS328B	Undertake Dam Safety Surveillance	30
UEPOPS329B	Operate and Monitor Auxiliary Steam Systems	40
UEPOPS330B	Operate and Monitor Heat Exchangers	40
UEPOPS331B	Operate and Monitor Water Systems (Condensate & Feedwater)	40
UEPOPS332B	Operate and Monitor Condensing and Cooling Water System	40
UEPOPS333B	Operate and Monitor H.R.S.G. Hot Gas Control System	40
UEPOPS334B	Operate and Monitor a Wind Generator	60
UEPOPS335B	Operate A Hydro Generator/Synchronous Condenser / Pump Unit	60
UEPOPS336B	Manage Operate and Monitor a Gas Turbine Unit	60
UEPOPS338B	Facilitate Effective Workplace Communication	20
UEPOPS339B	Operate and Monitor a Boiler Unit	60
UEPOPS340B	Operate and Monitor a Steam Turbine	60
UEPOPS343B	Operate Hydro-Electric Generating Plant and Auxiliary Equipment	60
UEPOPS344B	Conduct Water Conveyance and Control	30
UEPOPS345B	Implement Dam Safety Surveillance Procedures	30
UEPOPS346B	Conduct Non-Routine Operational Testing	60
UEPOPS347B	Operate and Monitor Supervisory, Control and Data Acquisition Systems	40
UEPOPS349B	Operate H.V. Primary Switchgear	40
UEPOPS351B	Operate H.V. Condition Changing Apparatus	60

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UEPOPS352B	Conduct Operational Checks on In-Service Mechanical Plant	40
UEPOPS354B	Operate and Monitor Dual Fuel-Firing Plant	80
UEPOPS355B	Monitor the Implementation of Under Frequency Load Shedding	60
UEPOPS356B	Apply Environmental and Sustainable Energy Procedures	20
UEPOPS357B	Operate H.V. Secondary Switchgear	40
UEPOPS358A	Monitor and Maintain Wind Farm Civil Assets	40
UEPOPS359A	Monitor Climatic Conditions for Renewable Energy Production	40
UEPOPS360A	Operate and Monitor a Hydro Turbine	60
UEPOPS361A	Operate and Monitor Hydro Plant Auxiliary Systems	60
UEPOPS362A	Operate and Monitor Generator/Alternator	60
UEPOPS364A	Ensure Compliance with Occupational Health and Safety policy and procedures	20
UEPOPS368A	Operate manual systems	30
UEPOPS369A	Respond to a critical incident	40
UEPOPS370A	Facilitate the use of contingency plans	60
UEPOPS371A	Carry out operational checks on in-service electrical plant	40

Group C Qualification Electives Complete units to a maximum weighting of 180 points		**Weighting Points**
UEPOPS404B	Coordinate First Response Team Operation	20
UEPOPS407B	Start and Run Up A Gas Turbine	60
UEPOPS408B	Shut Down a Gas Turbine	60
UEPOPS409B	Start-Up A Boiler Unit	60

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UEPOPS410B	Shut Down A Boiler Unit	60
UEPOPS411B	Run Up A Steam Turbine	60
UEPOPS412B	Undertake Operations Commissioning / Decommissioning	30
UEPOPS413B	Coordinate Operational Strategies for Power Production	20
UEPOPS414B	Perform Risk Analysis of Generation Plant	20
UEPOPS416B	Monitor the Implementation of the Enterprise's Production / Maintenance Quality Control procedures	20
UEPOPS419B	Shut down a steam turbine	60
UEPOPS420B	Coordinate the Network/System	40
UEPOPS422B	Schedule Generation	40
UEPOPS423B	Plan a Scheduled Outage	40
UEPOPS424B	Coordinate Local H.V. Networks	40
UEPOPS425B	Produce Maintenance Plans For Generation Production Plant	40
UEPOPS428B	Develop H.V. Switching Programs	40
UEPOPS430B	Control Permit to Work Operations	30
UEPOPS431B	Collect and Analyse Hydrological and Meteorological Data	20
UEPOPS432B	Start up a Heat Recovery Steam Generator Unit	30
UEPOPS433B	Operate and Monitor a Heat Recovery Steam Generator Unit	20
UEPOPS434B	Shutdown an Heat Recovery Steam Generator Unit	30
UEPOPS435B	Operate and Monitor Flue Gas NOx Mitigation Systems	30
UEPOPS437B	Manage System Re-Start	40
UEPOPS441B	Operate and Monitor System Equipment	30
UEPOPS442B	Monitor and Co-ordinate the Operation of a Combined Cycle Gas Turbine Unit	60

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UEPOPS443A	Coordinate Wind Farm Operations	40
UEPOPS444A	Start and Run-up a Hydro Turbine	60
UEPOPS445A	Shut Down a Hydro Turbine	60
UEPOPS446A	Operate and monitor hydro unit control and protection systems	80
UEPOPS447A	Coordinate photovoltaic solar power plant operations	60
UEPOPS450A	Coordinate effective workplace communication	40
UEPOPS451A	Coordinate the use of contingency plans	40
UEPOPS452A	Conduct operational checks and carry out corrective action on in-service electrical plant	40
UEPOPS456A	Perform switching to a switching program	30
UEPOPL001A	Licence to operate a steam turbine	60
UEPOPL002A	Licence to operate a reciprocating steam engine	60

Group D Qualification Electives At least 240 points to be achieved from this group. You may select all your elective units from this Group		**Weighting Points**
UEPOPS505B	Produce maintenance strategies for generation production plant	80
UEPOPS507B	Conduct Project Management	60
UEPOPS508B	Manage commissioning/ decommissioning	80
UEPOPS510B	Monitor Power Generation Plant Reliability	60
UEPOPS511B	Tune Process Plant and Equipment	60
UEPOPS512B	Manage the Network/System	80
UEPOPS514B	Control hydro generation/pumping	60
UEPOPS515B	Coordinate Power Generation	40
UEPOPS520A	Evaluate cost estimations and initiate appropriate solutions	40

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Group D Qualification Electives At least 240 points to be achieved from this group. You may select all your elective units from this Group		**Weighting Points**
UEPOPS523A	Manage critical incidents	60
UEPOPS524A	Evaluate the scheduling of generation	60
UEPOPS525A	Coordinate and direct switching program	60
UEPOPS526A	Coordinate electrical energy production	60
UEPOPS527A	Manage first response team	40
UEPOPS528A	Manage environmental management systems	40
UEPOPS529A	Manage operational strategies for power production	80

Note:

1. Prerequisite pathways shall be identified and met for all elective units selected.

2. In selecting elective units considerations to career planning advice should be given to units that form part of a prerequisite pathway for the progression to achieve particular competencies or qualification at a higher level.

END OF QUALIFICATION

Custom Content Section

Not applicable.

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UEP50312 Diploma of ESI Generation (Maintenance)

Modification History

Release	Action	Core/Elective	Details	Points
2	Update	Group A	BSBWHS501A Ensure a safe workplace	60
2	Update	Group C	Correct unit code MEM05024B Perform welding supervision	120
3	Edit	Core	Correct weighting points of UEPOPS416B – Monitor the implementation of the enterprise's production-maintenance quality control procedures	20
3	Edit	Core	Correct weighting points of UEPOPS439B – Plan and organise work	30
3	Edit	Core	Correct weighting points of UEPOPS440B – Coordinate team activities	30
3	Edit	Core	Correct weighting points of UEPOPS505B – Produce maintenance strategies for generation production plant	80

Description

Scope: Those gaining this qualification will be able to complete work function such as development of maintenance schedules and project management. Development of operational procedures and systems, implementation of safe working practices and environmental procedures. Management and supervision of others and coordination of work activities of individuals and/or teams

Pathways Information

Not applicable.

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Licensing/Regulatory Information

Not applicable.

Entry Requirements

Not applicable.

Employability Skills Summary

Not applicable.

Packaging Rules

Completion requirements:

The requirements for granting this qualification will be met when competency is demonstrated and achieved for:

- All the Core competency standard units, defined in the Core Competency Standard Units table below and
- A combination of Elective competency standard units to achieve a total weighting of 1070 points in accordance with the Elective Competency Standard Units table below.

Core Competency Standard Units All core competency standard units to be achieved		**Weighting Points**
MEM09002B	Interpret technical drawing	40
MEM12023A	Perform engineering measurements	50
MEM18001C	Use hand tools	20
MEM18002B	Use power tools/hand held operations	20
UEPMNT421B	Conduct Technical Inspection of Process Plant and Equipment	60
UEENEEE117A	Implement and monitor energy sector OHS policies and procedures	20
UEENEEE101A	Apply Occupational Health and Safety regulations, codes and practices in the workplace	20
UEPOPS337B	Maintain Quality Systems within the Team	20

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UEPOPS338B	Facilitate Effective Workplace Communications	20
UEPOPS416B	Monitor the Implementation of Enterprises Production/Maintenance Quality Control Procedures	20
UEPOPS417B	Monitor and Implement Environmental Plans and Procedures	20
UEPOPS430B	Control permit to work operations	20
UEPOPS439B	Plan and Organise Work	30
UEPOPS440B	Coordinate Team Activities	30
UEPOPS501B	Manage Occupational Health and Safety Policy and Procedures	40
UEPOPS505B	Produce Maintenance Strategies for Generation Production Plant	40
UEPOPS507B	Conduct Project Management	60
Total points in core		**530**

Elective Competency Standard Units Complete Elective units to achieve a total of weighting of 1070 points from the following groups:		
Group	**Minimum points**	**Maximum points**
A Imported and Common Elective Units Imported units from other training packages and/or state accredited courses can be added to this group, but they must be selected from qualifications where the unit is first packaged at AQF level 5. If units have not being assigned a weighting by the relevant EE-Oz Industry Technical Advisory Committee, their weighting will be 10 points.	0	270
B Qualification Electives You may select units from this group for qualification completion.	0	770
C Qualification Electives You may select units from this group for qualification	0	120

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completion.		
D Qualification Electives You may select units from this group for qualification completion.	180	940

Group A - Imported and Common Elective Units. Complete units to a maximum weighting of 270 points		**Weighting Points**
BSBCUS501C	Manage quality customer service	40
BSBINM501A	Manage an information or knowledge management system	50
BSBINN502A	Build and sustain an innovative work environment	50
BSBLED501A	Develop a workplace learning environment	60
BSBMGT502B	Manage people performance	70
BSBMGT515A	Manage operational plan	60
BSBMGT516C	Facilitate continuous improvement	60
BSBWHS501A	Ensure a Safe Workplace	60
BSBWOR501B	Manage personal work priorities and professional development	60
BSBWOR502B	Ensure team effectiveness	60
	Imported units from other training packages and/or state accredited courses can be added to this group, but they must be selected from qualifications where the unit is first packaged at AQF level 5. If units have not being assigned a weighting by the relevant EE-Oz Industry Technical Advisory Committee, their weighting will be 10 points. Note: For further information see Application of the NQC Flexibility Formula, Page 10, UEP12 ESI Generation Sector Training Package, Part1.1.00	Up to 270 points

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Group B Qualification Electives. Complete units to a maximum weighting of 770 points.		**Weighting Points**
MEM05007C	Perform manual heating and thermal cutting	20
MEM05012C	Perform routine manual metal arc welding	20
MEM05015D	Weld using manual metal arc welding process	40
MEM05017D	Weld using gas metal arc welding process	40
MEM05026C	Apply welding principles	40
MEM05050B	Perform routine gas metal arc welding	20
MEM05051A	Select welding processes	20
MEM05052A	Apply safe welding practices	40
MEM07005C	Perform general machining	80
MEM07006C	Perform lathe operations	40
MEM07007C	Perform milling operations	40
MEM07008D	Perform grinding operations	40
MEM12003B	Perform precision mechanical measurement	20
MEM12024A	Perform Computations	30
MEM18003C	Use tools for precision work	40
MEM18006C	Repair and fit engineering components	60
MEM18007B	Maintain and repair mechanical drives and mechanical transmission assemblies	40
MEM18009B	Perform levelling and alignment of machines and engineering components	40
MEM18010C	Perform equipment condition monitoring and recording	40
MEM18055B	Dismantle, replace and assemble engineering components	30

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UEPMNT302B	Install and Maintain Industrial Pipework	40
UEPMNT303B	Maintain Mechanical Valves	40
UEPMNT304B	Maintain Mechanical Pumps	40
UEPMNT305B	Maintain Industrial Fans	40
UEPMNT307B	Maintain Industrial Screens, Strainers and Filters	20
UEPMNT308B	Maintain Conveyors and Associated Equipment	40
UEPMNT309B	Maintain Material Feeders	40
UEPMNT310B	Maintain Material Crushers	40
UEPMNT311B	Maintain Fuel Transport Equipment	80
UEPMNT312B	Maintain Industrial Pressure Vessels	80
UEPMNT313B	Maintain Internal Combustion Engines	100
UEPMNT314B	Maintain Hydro Turbines	100
UEPMNT315B	Maintain Wind Turbines	100
UEPMNT317B	Diagnose and Repair Faults in Mechanical Equipment	40
UEPMNT318B	Conduct Generator Mechanical Maintenance	80
UEPOPS301B	Conduct Single Energy Source Isolation Procedures for Permit to Work	40

Group C Qualification Electives Complete units to a maximum weighting of 120 points.		**Weighting Points**
MEM05016C	Perform advanced welding using manual metal arc welding process	40
MEM05018C	Perform advanced welding using gas metal arc welding process	40
MEM05024B	Perform welding supervision	120
MEM07011B	Perform complex milling operations	40

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MEM07012B	Perform complex grinding operations	40
MEM07021B	Perform complex lathe operations	40
UEPMNT401B	Install and Maintain Complex Mechanical Seals	40
UEPMNT402B	Conduct Complex Levelling and Alignment	40
UEPMNT403B	Maintain Complex Mechanical Valves	40
UEPMNT404B	Maintain Complex Mechanical Pumps	40
UEPMNT406B	Install and Maintain a Steam Turbine	100
UEPMNT407B	Install and Maintain a Gas Turbine	100
UEPMNT408B	Install Hydro Turbines	100
UEPMNT419B	Perform Civil Drafting	60
UEPMNT422B	Conduct Performance Testing on Process Plant and Equipment	60
UEPMNT424B	Monitor Efficiency of Thermal Steam Cycle Power Plant	60
UEPMNT435A	Diagnose and Repair Faults in Wind Turbine Mechanical Systems	80
UEPOPS402B	Conduct Multiple Energy Source Isolation Procedures for procedures for a Permit to Work	40

Group D Qualification Electives You must complete units to a minimum weighting of 180. You may select units to a maximum weighting of 880.		**Weighting Points**
UEPOPS502B	Manage Permit to Work System	40
UEPOPS508B	Manage Commissioning/Decommissioning	60
UEPOPS509B	Manage quality control procedures	40
UEPOPS510B	Monitor power generation plant reliability	60
UEPOPS511B	Tune Process Plant and Equipment	60

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UEPOPS512B	Manage the Network/System	80
UEPOPS513B	Manage Operational Crisis to Maintain/Restore Power System Integrity	60
UEPOPS515B	Coordinate power generation	40
UEPOPS520A	Evaluate cost estimations and initiate appropriate solutions	40
UEPOPS523A	Manage critical incidents	60
UEPOPS524A	Evaluate the scheduling of generation	60
UEPOPS525A	Coordinate and direct switching program	60
UEPOPS526A	Coordinate electrical energy production	60
UEPOPS527A	Manage first response team	40
UEPOPS528A	Manage environmental management systems	40
UEPOPS529A	Manage operational strategies for power production	80

Note:

1. Prerequisite pathways shall be identified and met for all elective units selected.

2. In selecting elective units considerations to career planning advice should be given to units that form part of a prerequisite pathway for the progression to achieve particular competencies or qualification at a higher level.

END OF QUALIFICATION

Custom Content Section

Not applicable.

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UEP50412 Diploma of ESI Generation Maintenance - Electrical Electronic

Modification History

Release	Action	Core/Elective	Details	Points
2	Update	Group A	BSBWHS501A Ensure a safe workplace	60
3	Edit	Core	Correct weighting points of UEPOPS439B – Plan and organise work	30
3	Edit	Group C	Correct weighting points of UEPOPS440B – Coordinate team activities	30

Description

Scope: This qualification provides competencies to manufacture, fit, assemble, erect, operate, test, fault find, alter, repair electrical equipment, electronic, instrumentation systems, and includes electrical wiring work only if that work is associated with assembling, maintaining, terminating or altering the wiring between electrical components within a power generating plant or machinery. Development of maintenance schedules and project management. Implementation of safe working practices and environmental procedures. Management and supervision of others and coordination of work activities of individuals and/or teams.

Electrical equipment means any appliance, article, accessory, wire, fitting, cable, conduit or apparatus that generates, uses, conveys or controls (or that is intended to generate, use, convey or control) electricity above extra low voltage.

This qualification does not authorise the holder to install any electrical wiring systems within an electrical installation as prescribed by definitions contained in AS/NZS 3000.

Pathways Information

Not applicable.

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Licensing/Regulatory Information

Not applicable.

Entry Requirements

Not applicable.

Employability Skills Summary

Not applicable.

Packaging Rules

Completion requirements:

The requirements for granting this qualification will be met when competency is demonstrated and achieved for:

- All the Core competency standard units, defined in the Core Competency Standard Units table below and
- A combination of Elective competency standard units to achieve a total weighting of 590 points in accordance with the Elective Competency Standard Units table below.

Core Competency Standard Units All core competency standard units to be achieved		**Weighting Points**
UEENEEE101A	Apply Occupational Health and Safety regulations, codes and practices in the workplace	20
UEENEEE102A	Fabricate, dismantle, assemble utilities components	40
UEENEEE104A	Solve problems in d.c. circuits	80
UEENEEE105A	Fix and secure electrotechnology equipment	20
UEENEEE107A	Use drawings, diagrams, schedules, standards, codes and specifications	40
UEENEEE117A	Implement and monitor energy sector OHS policies and procedures	20
UEENEEE137A	Document and apply measures to control OHS risks associated with electrotechnology work	20
UEENEEG006A	Solve problems in single and three phase low voltage	80

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	machines	
UEENEEG033A	Solve problems in single and three phase low voltage electrical apparatus and circuits	60
UEENEEG063A	Arrange circuits, control and protection for general electrical installations	40
UEENEEG101A	Solve problems in electromagnetic devices and related circuits	60
UEENEEG102A	Solve problems in low voltage a.c circuits	80
UEENEEG106A	Terminate cables, cords and accessories for low voltage circuits	40
UEENEEG108A	Trouble-shoot and repair faults in low voltage electrical apparatus and circuits	40
UEENEEG109A	Develop and connect electrical control circuits	80
UEPOPS337B	Maintain Quality Systems within the Team	20
UEPOPS338B	Facilitate Effective Workplace Communications	20
UEPOPS371A	Carry out operational checks on in-service electrical plant	40
UEPOPS417B	Monitor and Implement Environmental Plans and Procedures	20
UEPOPS430B	Control permit to work operations	20
UEPOPS439B	Plan and Organise Work	30
UEPOPS501B	Manage Occupational Health and Safety Policy and Procedures	40
UEPOPS507B	Conduct Project Management	60
UEPOPS509B	Manage Quality Control Procedures	40
Total points in core		**1010**

Elective Competency Standard Units

Complete Elective units to achieve a total of weighting of 590 points from the following

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groups:			
Group		**Minimum points**	**Maximum points**
A	**Imported and Common Elective Units** Imported units from other training packages and/or state accredited courses can be added to this group, but they must be selected from qualifications where the unit is first packaged at AQF level 5. If units have not being assigned a weighting by the relevant EE-Oz Industry Technical Advisory Committee, their weighting will be 10 points.	0	270
B	**Qualification Electives** You may select units from this group for qualification completion.	0	180
C	**Qualification Electives** You may select units from this group for qualification completion.	0	240
D	**Qualification Electives** You may select all your elective units from this Group	180	540

Group A - Imported and Common Elective Units. Complete units to a maximum weighting of 270 points		**Weighting Points**
BSBWOR501B	Manage personal work priorities and professional development	60
BSBMGT502B	Manage people performance	70
BSBMGT515A	Manage operational plan	60
BSBINM501A	Manage an information or knowledge management system	50
BSBCUS501C	Manage quality customer service	40
BSBMGT516C	Facilitate continuous improvement	60

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BSBINN502A	Build and sustain an innovative work environment	50
BSBLED501A	Develop a workplace learning environment	60
BSBWOR502B	Ensure team effectiveness	60
BSBWHS501A	Ensure a Safe Workplace	60
	Imported units from other training packages and/or state accredited courses can be added to this group, but they must be selected from qualifications where the unit is first packaged at AQF level 5. If units have not being assigned a weighting by the relevant EE-Oz Industry Technical Advisory Committee, their weighting will be 10 points. Note: For further information see Application of the NQC Flexibility Formula, Page 10, UEP12 ESI Generation Sector Training Package, Part1.1.00	Up to 270 points

Group B Qualification Electives. Complete units to a maximum weighting of 180 points		**Weighting Points**
UEPMNT319B	Maintain and Test Fixed Fire Protection Systems	20
UEPMNT345B	Install electronic equipment	40
UEPMNT346B	Maintain electrical equipment	40
UEPMNT347B	Maintain complex electrical equipment	60
UEPMNT348B	Maintain electrical electronic equipment	40
UEPMNT350B	Modify electrical equipment	40
UEPMNT351B	Test and commission electrical equipment	40
UEPMNT352B	Test and commission electronic electrical equipment	40
UEPMNT355B	Install complex/electronic instrumentation equipment	40

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UEPMNT356B	Maintain instrumentation equipment	40
UEPMNT357B	Diagnose and repair faults in instrumentation equipment	60
UEPMNT358B	Modify instrumentation equipment	40
UEPMNT359B	Test and Commission Instrumentation Systems	40
UEPMNT361A	Maintain Wind Turbine Mechanical Systems	60
UEPMNT362A	Maintain Wind Turbine Control Systems	60
UEPMNT366A	Maintain power plant inverter systems	60
UEPOPS301B	Conduct Single Energy Source Isolation Procedures for Permit to Work	40

Group C Qualification Electives. Complete units to a maximum weighting of 240 points		**Weighting Points**
UEENEEC005B	Estimate electrotechnology projects	40
UEENEEE124A	Compile and produce an energy sector report	60
UEPMNT410B	Diagnose and Repair Faults in Electronic Equipment	60
UEPMNT411B	Diagnose and Repair Faults in Complex Electrical Equipment	60
UEPMNT412B	Modify Complex Electrical Equipment	60
UEPMNT413B	Modify Electronic Electrical Equipment	60
UEPMNT414B	Test and Commission Complex Electrical Equipment	60
UEPMNT415B	Diagnose and Repair Faults in Complex Refrigeration / Air Conditioning Equipment	60
UEPMNT416B	Overhaul Electrical Generators	80
UEPMNT417B	Inspect Electrical Generators and Diagnose Faults	80
UEPMNT421B	Conduct Technical Inspection of Process Plant and Equipment	60

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UEPMNT422B	Conduct Performance Testing on Process Plant and Equipment	60
UEPMNT424B	Monitor Efficiency of Thermal Steam Cycle Power Plant	60
UEPMNT425B	Maintain Complex Instrumentation Equipment	80
UEPMNT426B	Maintain Electronic Instrumentation Equipment	80
UEPMNT427B	Diagnose and Repair Faults in Complex Instrumentation Equipment	80
UEPMNT428B	Modify Complex Instrumentation Equipment	80
UEPMNT429B	Modify Electronic Instrumentation Equipment	80
UEPMNT430B	Test and Commission Complex Instrumentation Equipment	80
UEPMNT431B	Test and Commission Electronic Instrumentation Equipment	80
UEPOPS402B	Conduct Multiple Energy Source Isolation Procedures for procedures for a Permit to Work	40
UEPOPS440B	Coordinate Team Activities	30

Group D Qualification Electives. You must complete units to a minimum weighting of 180. You may select units to a maximum weighting of 540.		**Weighting Points**
UEPMNT501B	Diagnose and Repair Faults in Electrical and Electronic Systems	100
UEPMNT502B	Test and Commission Electronic Electrical Systems	100
UEPMNT503B	Diagnose and Repair Faults in Instrumentation Systems	100
UEPMNT504B	Test and Commission Instrumentation Systems	100
UEPOPS508B	Manage Commissioning/Decommissioning	80
UEPOPS511B	Tune Process Plant and Equipment	60

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Note:

1. Prerequisite pathways shall be identified and met for all elective units selected.

2. In selecting elective units considerations to career planning advice should be given to units that form part of a prerequisite pathway for the progression to achieve particular competencies or qualification at a higher level.

END OF QUALIFICATION

Custom Content Section

Not applicable.

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UEPSS00001 High Risk Licencing - Licence to operate a reciprocating steam engine

Modification History

Not applicable.

Description

Not applicable.

Pathways Information

This Skill Set can be a stand-alone licensing outcome or the unit it comprises credited in any qualification where it is included as core or an elective option.

Licensing/Regulatory Information

Meets national High Risk Work Licensing for operators of Reciprocating Steam Engines

Skill Set Requirements

UEPOPL002A Licence to operate a reciprocating steam engine

Target Group

The target group is reciprocating steam engine operators operating reciprocating steam engines that require occupational licencing by a State or Territory OHS regulator.

Suggested words for Statement of Attainment

This Skill Set meets the minimum industry requirements for high risk work licensing of operators of reciprocating steam engines.

Custom Content Section

Not applicable.

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UEPSS00002 High Risk Licensing - Licence to operate a steam turbine

Modification History

Not applicable.

Description

Not applicable.

Pathways Information

This Skill Set can be a stand-alone licensing outcome or the unit it comprises credited in any qualification where it is included as core or an elective option.

Licensing/Regulatory Information

Meets national High Risk Work Licensing for operators of Steam Trubines

Skill Set Requirements

UEPOPL001A Licence to operate a steam turbine

Target Group

The target group is steam turbine operators, operating steam turbines, that require occupational licencing by a State or Territory OHS regulator.

Suggested words for Statement of Attainment

This Skill Set meets the minimum industry requirements for high risk work licensing of operators of steam turbines.

Custom Content Section

Not applicable.

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UEPSS00003 High Voltage Operation - H.V. Switching

Modification History

Not applicable.

Description

This skill set deals with the skills and knowledge required to undertake the local operation of high voltage circuit breaking devices and performance of H.V. switching to a given switching program.

Pathways Information

The units of competency in this skill set will contribute to the completion of relevant Certificate III, Certificate IV and Diploma qualifications from the UEP12 Electricity Supply Industry - Generation Sector Training Package. Please consult the packaging rules of the relevant qualification for further advice.

Licensing/Regulatory Information

The skills and knowledge described in this Skill Set do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like

Skill Set Requirements

UEPOPS349B Operate Local H.V. switchgear

UEPOPS456A Perform switching to a switching program

Target Group

It is essential that anyone undertaking this skill set must already hold:

Certificate III in Electrical Fitting (UEE33011) or Certificate III in Electrical Fitting (UEE33011) or equivalent.

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Suggested words for Statement of Attainment

This Skill Set from the UEP12 Electricity Supply Industry - Generation Sector Training Package meets the industry requirements for High Voltage Operation – H.V. Switching

Custom Content Section

Not applicable.

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UEPSS00004 High Voltage Operation - Development and co-ordination of H.V. Switching Programs

Modification History

Not applicable.

Description

This unit deals with the skills and knowledge required to develop switching programs where multiple sources of supply must be considered and managed and coordinate the local control and management of HV substations and/or local networks.

Pathways Information

The units of competency in this skill set will contribute to the completion of relevant Certificate III, Certificate IV and Diploma qualifications from the UEP12 Electricity Supply Industry - Generation Sector Training Package. Please consult the packaging rules of the relevant qualification for further advice.

Licensing/Regulatory Information

The skills and knowledge described in this Skill Set do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

Skill Set Requirements

UEPOPS424B	Coordinate local H.V. networks
UEPOPS428B	Develop H.V. switching programs

Target Group

It is essential that anyone undertaking this skill set must already hold:

Certificate III in ESI Generation – Systems Operations (UEP30112) or equivalent

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Suggested words for Statement of Attainment

This Skill Set from the UEP12 Electricity Supply Industry - Generation Sector Training Package meets the industry requirements for High Voltage Operation – Development and co-ordination of H.V. Switching Programs

Custom Content Section

Not applicable.

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UEPMNT201A Carry out routine work activities in an electricity supply industry generation environment

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor

1) Scope:

1.1) Descriptor

This unit covers undertaking scheduled routine work activities in the electricity supply industry generation sector

Application of the Unit

Application of the Unit

2)

This competency standard is suitable for school based and employment-based programs under an approved contract of training at the AQF level of the qualification in which the unit is first packaged or higher.

The unit may be selected as an elective from the relevant elective group (see qualification packaging rules) provided that all prerequisite units are undertaken or addressed through recognition processes.

This unit may be included in a skill set provided that it is listed in the schedule of electives (see Qualification Framework) and all prerequisite units are undertaken or addressed through recognition processes.

Delivery and assessment of this unit should be undertaken within regard to the requirements of License to Practice (3 below), Prerequisite Competencies and Literacy and Numeracy skills (4 below) and the recommendations for concurrent assessment and relationship with other units (9.5 below).

Practice in the workplace and during training is also subject to regulations directly related to occupational health and safety and where applicable contracts of

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training such as apprenticeships.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a license to practice in the workplace. However practice in this unit is subject to regulations directly related to occupational health and safe and contracts of training such as new apprenticeships.

Note:

1. Compliance with permits may be required in various jurisdictions and typically relates to the operation of plant, machinery and equipment such as elevating work platforms, powder operated fixing tools, and power operated tools, vehicles, road signage and traffic control, lifting equipment. Permits may also be required for some work environments such as confined spaces, working aloft, near live electrical apparatus and site rehabilitation.

2. Compliance may be required in various jurisdictions relating to currency in First Aid, confined space, lifting and risk safety measures.

Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must have been completed.

Common Unit Group

Unit Code	Unit Title
UEENEEE101A	Apply Occupational Health and

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Prerequisite Unit(s) **4)**

Safety regulations, codes and practices in the workplace

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

This unit contains Employability Skills.

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT **PERFORMANCE CRITERIA**

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ELEMENT	PERFORMANCE CRITERIA	
1 Prepare to undertake routine work activities.	1.1	Instructions for preparing the work activity are communicated and confirmed to ensure clear understanding.
	1.2	OHS policies and procedures are communicated and confirmed to ensure they are understood as they apply to the carrying out of the work.
	1.3	Tools, equipment and personnel protective equipment necessary for the work are identified, scheduled and checked to ensure they work correctly as intended and are safe to use in accordance with established procedures.
	1.4	Appropriate personnel are consulted to ensure the work is coordinated effectively with others involved.
	1.5	Resources and materials needed to do the work are confirmed, scheduled and obtained in accordance with established procedures.
	1.6	Schedule of work including practices for working safely are confirmed in accordance with instructions and requirements.
2 Carry out work as instructed.	2.1	OHS policies and procedures and safe work practices are followed to eliminate or minimise incidents.
	2.2	Schedule of work is followed to ensure work is completed in an agreed time, to a quality standard and with a minimum of waste.
	2.3	Knowledge of work practices applicable to the wind generation industry are applied to routine work activities.
	2.4	Further instructions are sought from appropriate personnel in the event of unplanned happenings or conditions.
	2.5	Ongoing checks of work quality are undertaken in accordance with instructions and requirements.
3 Check results of the	3.1	Final checks are made to ensure the work

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ELEMENT	PERFORMANCE CRITERIA	
completed work.		conforms with instructions and to requirements.
	3.2	Appropriate personnel are notified of completion of the work.
	3.3	Tools, equipment and any surplus resources and materials are, where appropriate, cleaned, checked and returned to storage in accordance with established procedures.
	3.4	Work area is cleaned up and made safe and sustainable energy practices are followed.
	3.5	Appropriate records are updated in accordance with instructions and established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

KS01-PM20 Routine work activities in an ESI generation environment 1A

Evidence shall show that knowledge has been acquired of routine work activities in an ESI generation environment to the extent indicated by the following aspects:

T1. ESI generation

- Coal fired electricity generation
- Gas fired electricity generation
- Gas turbine electricity generation
- Oil fired electricity generation
- Hydro-electricity generation
- Co-generation and tri-generation systems
- Bio-mass electricity generation
- Large-scale photo-voltaic electricity generation
- Large-scale wind generation
- Other forms of large scale renewable electricity generation

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REQUIRED SKILLS AND KNOWLEDGE

- Mix of electricity generation in the marketplace

T2. Workplace health and safety in the ESI generation industry

- Electrical
- Mechanical
- Hydraulic
- Pneumatic (pressurised air)
- Steam
- Toxic gases and chemicals used in the industry

T3. Overview of the electricity distribution network

- Generators
- Substations and switching yards
- Transformers
- Circuit breakers and switches/isolators
- Common voltages
- 3-phase and single-phase electricity supply
- Electricity distributors and electricity retailers

T4. Lubrication

- Refilling of greasing systems
- Checking oil levels
- Confirming lubrication of components

T5. Cleaning

- Excess grease
- Dust
- Oil
- Water
- Salt
- Cleaning chemicals
  - Appropriateness of use
  - MSDS for cleaning products
  - Use of cleaning products in restricted spaces
  - Prohibited cleaning solvents

T6. Warehousing

- Enterprise procedures for managing stock levels
  - Computer stock control
- Loading and unloading stock and products
  - Shelving

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REQUIRED SKILLS AND KNOWLEDGE

- Inward goods receiving
- Manual handling
- Trolleys
- Enterprise communication protocols

Evidence Guide

EVIDENCE GUIDE

9) The Evidence Guide forms an integral part of this Unit and shall be used in conjunction with all components parts of this unit and performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the industry-preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accordance with industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Sources of evidence need to be ‘rich’ in nature to minimise error in judgment.

Activities associated with normal everyday work have a bearing on the decision as to how much and how detailed the data gathered

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will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines, Section 3.1 of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated:

- On at least two (2) occasions. In accordance with the "Assessment Guidelines" for the UEP12 Training Package.

Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframe typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and range; and
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and range; and
  - Demonstrate an understanding of the required skills and knowledge as described in this unit to such an extent that the learner's performance outcome is reported in accordance with the preferred approach; namely a percentile graded result, where required by the regulated environment; and
  - Demonstrate an appropriate level of employability skills; and
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, policies and workplace procedures; and
- Demonstrated performance across a representative range of contexts from the prescribed items below:

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A All of the following:

- Receive a stock delivery and enter into the stock management system
- Store stock using appropriate work, health and safety practices
- Retrieve a stock item and check it out of the stock management system

B All of the following:

- Clean up an oil spill
- Clean up a grease spill
- Retrieve an MSDS for a cleaning solvent

C All of the following:

- Grease a bearing
- Refill greasers

D All of the following:

- Deal with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

These should be used in the formal learning/assessment environment.

Note:

Where simulation is considered a suitable strategy for assessment, conditions must be authentic and as far as possible reproduce and replicate the workplace and be consistent with the approved industry simulation policy.

The resources used for assessment should reflect current industry

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practices in relation to:

Carry out routine work activities in an electricity supply industry generation environment.

Method of assessment

9.4)

This unit shall be assessed by methods given in the Assessment Guidelines, Section 1.3 of this Training Package.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this competency standard unit applies. This requires assessment in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no concurrent assessment recommendations for this unit.

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Large scale electricity plant is considered to be 10 kW and above

Scheduled servicing and maintenance activities may include assisting experienced technicians

Work areas requiring permits or licences are excluded from access unless accompanied by an appropriate and competent person

Greasing systems may be manual or automatic systems

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RANGE STATEMENT

Tools include spanners, screwdrivers, torque wrenches

Cleaning equipment includes rags, chemical cleaners, hoses and water cannons

Stock management systems include computer-based, internet, and paper-based enterprise systems and documents

Generic terms used throughout this Vocational Standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms that apply are given in the Glossaries, Section 2.1 of this Training Package.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Maintenance

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UEPMNT202A Carry out routine work activities in an ESI large scale wind generation environment

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor

1) Scope:

1.1) Descriptor

This unit covers undertaking scheduled routine work activities in the electricity supply industry (ESI) large scale wind generation sector

Application of the Unit

Application of the Unit

2)

This competency standard is suitable for school based and employment-based programs under an approved contract of training at the AQF level of the qualification in which the unit is first packaged or higher.

The unit may be selected as an elective from the relevant elective group (see qualification packaging rules) provided that all prerequisite units are undertaken or addressed through recognition processes.

This unit may be included in a skill set provided that it is listed in the schedule of electives (see Qualification Framework) and all prerequisite units are undertaken or addressed through recognition processes.

Delivery and assessment of this unit should be undertaken within regard to the requirements of License to Practice (3 below), Prerequisite Competencies and Literacy and Numeracy skills (4 below) and the recommendations for concurrent assessment and relationship with other units (9.5 below).

Practice in the workplace and during training is also subject to regulations directly related to occupational health and safety and where applicable contracts of

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training such as apprenticeships.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a license to practice in the workplace. However practice in this unit is subject to regulations directly related to occupational health and safe and contracts of training such as new apprenticeships.

Note:

1. Compliance with permits may be required in various jurisdictions and typically relates to the operation of plant, machinery and equipment such as elevating work platforms, powder operated fixing tools, and power operated tools, vehicles, road signage and traffic control, lifting equipment. Permits may also be required for some work environments such as confined spaces, working aloft, near live electrical apparatus and site rehabilitation.

2. Compliance may be required in various jurisdictions relating to currency in First Aid, confined space, lifting and risk safety measures.

Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must have been completed.

Common Unit Group

Unit Code	Unit Title
UEENEEE101A	Apply Occupational Health and

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Prerequisite Unit(s) **4)**

Safety regulations, codes and practices in the workplace

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

This unit contains Employability Skills.

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT **PERFORMANCE CRITERIA**

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ELEMENT	PERFORMANCE CRITERIA	
1 Prepare to undertake routine work activities.	1.1	Instructions for preparing the work activity are communicated and confirmed to ensure clear understanding.
	1.2	OHS policies and procedures are communicated and confirmed to ensure they are understood as they apply to the carrying out of the work.
	1.3	Tools, equipment and personnel protective equipment necessary for the work are identified, scheduled and checked to ensure they work correctly as intended and are safe to use in accordance with established procedures.
	1.4	Appropriate personnel are consulted to ensure the work is coordinated effectively with others involved.
	1.5	Resources and materials needed to do the work are confirmed, scheduled and obtained in accordance with established procedures.
	1.6	Schedule of work including practices for working safely are confirmed in accordance with instructions and requirements.
2 Carry out work as instructed.	2.1	OHS policies and procedures and safe work practices are followed to eliminate or minimise incidents.
	2.2	Schedule of work is followed to ensure work is completed in an agreed time, to a quality standard and with a minimum of waste.
	2.3	Knowledge of work practices applicable to the wind generation industry are applied to routine work activities.
	2.4	Further instructions are sought from appropriate personnel in the event of unplanned happenings or conditions.
	2.5	Ongoing checks of work quality are undertaken in accordance with instructions and requirements.
3 Check results of the	3.1	Final checks are made to ensure the work

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ELEMENT	PERFORMANCE CRITERIA	
completed work.		conforms with instructions and to requirements.
	3.2	Appropriate personnel are notified of completion of the work.
	3.3	Tools, equipment and any surplus resources and materials are, where appropriate, cleaned, checked and returned to storage in accordance with established procedures.
	3.4	Work area is cleaned up and made safe and sustainable energy practices are followed.
	3.5	Appropriate records are updated in accordance with instructions and established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

KS01-PM202A Routine work activities in an ESI large scale wind generation environment

Evidence shall show that knowledge has been acquired of routine work activities in an ESI large scale wind generation environment to the extent indicated by the following aspects:

T1. The wind generation industry

- Climate change
- Mix of electricity generation in the marketplace

T2. Wind generation

- Power available in the wind
- Classes of Wind Turbine Generator(WTG)
- Geographic placement of WTGs

T3. Workplace health and safety in the wind generation industry

- Electrical

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REQUIRED SKILLS AND KNOWLEDGE

- Mechanical
- Hydraulic
- Working in environmental climates subject to high wind velocity
- Working at heights on a WTG

T4. Components that form a WTG

- Tower
- Blades
- Nacelle
- Generator
- DC/AC converter
- Power transformer
- Grid connection
- Control systems
  - SCADA and similar control systems

T5. Lubrication

- Refilling of automatic greasing systems
- Checking oil levels
- Confirming lubrication of components

T6. Cleaning

- Excess grease
- Dust
- Oil
- Water
- Salt
- Cleaning chemicals
  - Appropriateness of use
  - MSDS for cleaning products
  - Use of cleaning products in restricted spaces
  - Prohibited cleaning solvents

T7. Warehousing

- Enterprise procedures for managing stock levels
  - Computer stock control
- Loading and unloading stock and products
  - Shelving
  - Inward goods receiving
  - Manual handling
  - Trolleys

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REQUIRED SKILLS AND KNOWLEDGE

- Enterprise communication protocols

Evidence Guide

EVIDENCE GUIDE

9) The Evidence Guide forms an integral part of this Unit and shall be used in conjunction with all components parts of this unit and performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the industry-preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accordance with industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Sources of evidence need to be ‘rich’ in nature to minimise error in judgment.

Activities associated with normal everyday work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its ‘richness’. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and

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developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines, Section 3.1 of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated:

- On at least two (2) occasions. In accordance with the "Assessment Guidelines" for the UEP12 Training Package.

Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframe typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and range; and
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and range; and
  - Demonstrate an understanding of the required skills and knowledge as described in this unit to such an extent that the learner's performance outcome is reported in accordance with the preferred approach; namely a percentile graded result, where required by the regulated environment; and
  - Demonstrate an appropriate level of employability skills; and
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, policies and workplace procedures; and

Demonstrated performance across a representative range of contexts from the prescribed items below:

A	All of the following	• Receive a stock delivery and enter into the stock management system • Store stock using appropriate work, health

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		and safety practices • Retrieve a stock item and check it out of the stock management system
B	All of the following	• Clean up an oil spill • Clean up a grease spill • Retrieve an MSDS for a cleaning solvent
C	All of the following	• Grease a bearing • Refill Greasers
D	All of the following	• Deal with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

These should be used in the formal learning/assessment environment.

Note:

Where simulation is considered a suitable strategy for assessment, conditions must be authentic and as far as possible reproduce and replicate the workplace and be consistent with the approved industry simulation policy.

The resources used for assessment should reflect current industry practices in relation to:

Carry out routine work activities in an ESI large scale wind generation environment.

Method of assessment

9.4)

This unit shall be assessed by methods given in the Assessment

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Guidelines, Section 1.3 of this Training Package.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this competency standard unit applies. This requires assessment in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no concurrent assessment recommendations for this unit.

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Large Scale Wind Generators (WTGs) include systems having a rating of greater than 10 kW

Routine work activities include:

Assisting experienced technicians with scheduled servicing

Fillng of auto-greasers

Routine work activities are restricted to access to the WTG tower and the nacelle

Tools include spanners, screwdrivers, torque wrenches,

Cleaning equipment includes rags, chemical cleaners

Stock management systems include computer-based, internet, and paper-based enterprise systems and documents

Generic terms used throughout this Vocational Standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms that apply are given in the Glossaries, Section 2.1 of this Training Package.

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Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Maintenance

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UEPMNT302B Install and maintain industrial pipework

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to undertake all work associated with the installation, maintenance, and fabrication of industrial pipework which may also involve fault finding and repairs.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
MEM18006C	Repair and fit engineering components
MEM09002B	Interpret technical drawing
MEM12023A	Perform Engineering Measurements
MEM18001C	Use hand tools
MEM18002B	Use power tools/hand held operations
MEM18003C	Use tools for precision work
MEM18055B	Dismantle, replace and assemble engineering components

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

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Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and prepare for the work	1.1 Work requirements are identified from request/work orders or equivalent and clarified/confirmed with appropriate parties or by site inspection
	1.2 Occupational Health and Safety standards, statutory requirements, relevant Australian standards, codes of practice, manufacturers' specifications, environmental requirements and enterprise procedures are identified, applied and monitored throughout the work procedure
	1.3 Resources required to satisfy the work plan are identified, obtained and inspected for compliance with the job specifications
	1.4 Relevant plans, drawings and texts are selected and interpreted in accordance with the work plan
	1.5 Correct size, type and quantity of materials/components are determined, obtained and inspected for compliance with the job

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ELEMENT		PERFORMANCE CRITERIA	
			specifications
		1.6	Work is planned in detail including sequencing and prioritising and considerations made, where appropriate, for the maintenance of plant security and capacity in accordance with system/site requirements
		1.7	Coordination requirements, including requests for isolations where appropriate, are resolved with others involved, affected or required by the work
		1.8	Potential hazards are identified and prevention and/or control measures are selected in accordance with the work plan and site procedures
		1.9	Work area is prepared in accordance with work requirements and site procedures
		1.10	Where appropriate, the teams and individuals roles and responsibilities within the team are identified, and where required, assist in the provision of on-the-job training
2	Fabricate and install pipe work	2.1	Required isolations are confirmed, where appropriate, in accordance with site requirements.
		2.2	Pipe runs are identified, calculations performed and sketches made of the planned installation in accordance with the work plan
		2.3	Pipe work is fabricated using appropriate techniques and equipment in accordance with the work plan
		2.4	Pipe work is levelled and aligned and installed/coupled in accordance with the work plan
3	Maintain industrial pipework	3.1	Pipe work found to be faulty is repaired/replaced to conform to site requirements or manufacturer specifications
		3.2	Pipe work modifications/alterations are undertaken in accordance with site requirements

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ELEMENT	PERFORMANCE CRITERIA	
		and manufacturers specifications
	3.3	Machinery/plant returned to service and pipe work monitored and adjusted in accordance with the work plan
4 Complete the work	4.1	Work is completed and appropriate personnel notified in accordance with site/enterprise requirements
	4.2	Work area is cleared of waste, cleaned, restored and secured in accordance with site/enterprise procedures
	4.3	Plant, tools and equipment are maintained and stored in accordance with site/enterprise procedures
	4.4	Work completion details are finalised in accordance with site/enterprise procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of installing and monitoring industrial pipework.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PM302B Industrial pipework

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant Environmental, Occupational Health and Safety legislation and regulations
- Pipe work materials and their applications
- measuring equipment
- Seals and gaskets
- Pipe bending principles

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REQUIRED SKILLS AND KNOWLEDGE

- Specialised tools and jigs
- Pipe levelling and alignment
- Rigging and lifting
- Relevant materials and components
- Technical drawings and manufacturers manuals
- Hand and portable power tools
- Testing techniques
- Relevant plant and equipment, its location
- Isolation procedures
- Protective coatings

T2 Specific skills needed to achieve the Performance Criteria:

- Apply Relevant Environmental, Occupational Health and Safety legislation and regulations
- Identify and use measuring equipment
- Apply pipe work fabrication and installation techniques
- Manufacture and install seals and gaskets
- Apply pipe levelling and alignment techniques
- Interpret Technical drawings and manufacturers manuals
- Identify and select materials and components
- Apply data analysis techniques
- Use hand and portable power tools
- Apply relevant testing techniques
- Apply dismantling and reassembling techniques
- Apply relevant maintenance procedures
- Recognise worn/damaged components
- Communicate effectively
- Apply relevant tools and jigs

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the range statement of the competency standard unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

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Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace; however, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit **9.2)**

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria

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shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The knowledge and application of relevant sections of occupational, health and safety legislation, statutory legislation, enterprise/site safety procedures and enterprise/site emergency procedures
  - Preparation and planning of work
  - Pipe work fabrication techniques and procedures
  - Maintenance techniques and procedures
  - Installation techniques and procedures
  - Completion of work procedures
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment **9.3)**

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

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- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and method and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

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Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Pipe work may be fabricated from material including, ABS, PVC, polyurethane, copper, stainless steel, galvanised steel, black steel, copper/nickel, concrete and mineral fibre.

Tools and equipment may include stocks, dyes, threading machine, hydraulic benders, hand benders, hand and power cutters, welders, plastic heat gun, spirit level, grinders, jigs and lifting devices.

Fittings/components may include couplings, screw fittings and flanges.

Pipes may contain or have contained water, gas, air or chemicals of a hazardous nature.

Pipe work may be protected by protective coatings.

Details of maintenance may be clarified by diagnosis and work place inspection.

Work completion details may include plant and maintenance records, job cards, check sheets, on device labelling updates and reporting and/or documenting equipment defects.

Work site environment may be affected by nearby plant or processes, e.g. chemical, heat, dust, noise, gas and oil.

Isolations can refer to electrical/mechanical or other associated processes.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1.00 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Maintenance.

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UEPMNT303B Maintain mechanical valves

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to undertake fault finding, diagnosis, repair and/or overhaul of mechanical valves, but excluding any associated servo or actuating unit.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
MEM18006C	Repair and fit engineering components
MEM09002B	Interpret technical drawing
MEM12023A	Perform Engineering Measurements
MEM18001C	Use hand tools
MEM18002B	Use power tools/hand held operations
MEM18003C	Use power tools/hand held operations
MEM18055B	Dismantle, replace and assemble engineering components

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

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Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and prepare for the work	1.1 Work requirements are identified from request/work orders or equivalent and clarified/confirmed with appropriate parties or by site inspection
	1.2 Occupational Health and Safety standards, statutory requirements, relevant Australian standards, codes of practice, manufacturers' specifications, environmental requirements and enterprise procedures are identified, applied and monitored throughout the work procedure
	1.3 Resources required to satisfy the work plan are identified, obtained and inspected for compliance with the job specifications
	1.4 Relevant plans, drawings and texts are selected and interpreted in accordance with the work plan
	1.5 Correct size, type and quantity of materials/components are determined, obtained and inspected for compliance with the job

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ELEMENT		PERFORMANCE CRITERIA	
			specifications
		1.6	Work is planned in detail including sequencing and prioritising and considerations made where appropriate for the maintenance of plant security and capacity in accordance with system/site requirements
		1.7	Coordination requirements, including requests for isolations where appropriate, are resolved with others involved, affected or required by the work
		1.8	Potential hazards are identified and prevention and/or control measures are selected in accordance with the work plan and site procedures
		1.9	Work area is prepared in accordance with work requirements and site procedures
		1.10	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of on-the-job training
2	Remove valves for maintenance	2.1	Required isolations are confirmed where appropriate in accordance with site requirements
		2.2	Valve is disconnected in accordance with the work plan
		2.3	Valve is removed in a manner which will assist in replacement in accordance with the work plan
		2.4	Valve is inspected for abnormalities in accordance with the work plan.
3	Perform valve maintenance	3.1	Maintenance is performed in accordance with manufacturers specifications and the work plan
		3.2	Valve is dismantled, clearly marked for identification and relevant sketches drawn in accordance with the work plan
		3.3	Components are correlated in preparation for re-assembly in accordance with manufacturer

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ELEMENT	PERFORMANCE CRITERIA	
		drawings/manuals
	3.4	New components are inspected to ensure compliance with manufacturer specifications
	3.5	Dimensional inspection is performed with precision measuring devices to ensure compliance with manufacturer specifications and site requirements
	3.6	Components are reassembled for testing in accordance with manufacturer specifications and site requirements
	3.7	Modifications/alterations are undertaken in accordance with manufacturer specifications and site requirements
	3.8	Components are levelled, aligned, coupled and connected in accordance with manufacturer specifications and site requirements
	3.9	Valves are pressure tested, monitored and adjusted if required in accordance with manufacturer specifications and the work plan
4 Replace/install valves	4.1	Site is prepared for valve replacement in accordance with the work plan
	4.2	Valve is replaced in accordance with the work plan and manufacturer specifications
	4.3	Valve is connected in accordance with the work plan and manufacturer specifications
	4.4	Final job inspection is completed and any permits relinquished in accordance with the work plan
5 Complete the work	5.1	Work is completed and appropriate personnel notified in accordance with site/enterprise requirements
	5.2	Work area is cleared of waste, cleaned, restored and secured in accordance with site/enterprise procedures
	5.3	Plant, tools and equipment are maintained and

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ELEMENT	PERFORMANCE CRITERIA	
		stored in accordance with site/enterprise procedures
	5.4	Work completion details are finalised in accordance with site/enterprise procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of maintaining mechanical valves.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

KS01-PM303B Mechanical valves

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant Environmental, Occupational Health and Safety legislation and regulations
- Relevant Australian standards
- Technical drawings and manufacturers manuals
- Valve, damper and actuator types and characteristics
- Precision measuring equipment
- Introduction to and typical arrangements of power production plant
- Seals and gaskets
- Specialised tools and jigs
- Relevant materials and components
- Hand and portable power tools
- Testing techniques

T2 Specific skills needed to achieve the Performance Criteria:

- Health and Safety legislation and regulations
- Identify and use precision measuring equipment
- Apply valve installation techniques
- Manufacture and install seals and gaskets
- Apply valve levelling and alignment techniques
- Interpret Technical drawings and manufacturers manuals

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REQUIRED SKILLS AND KNOWLEDGE

- Identify and select materials and components
- Apply data analysis techniques
- Use hand and portable power tools
- Apply relevant testing techniques
- Apply dismantling and reassembling techniques
- Apply relevant maintenance procedures
- Recognise worn/damaged components
- Communicate effectively
- Apply relevant tools and jigs
- Relevant Environmental, Occupational Health and Safety legislation and regulations
- Apply relevant standards
- Communicate effectively.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the range statement of the competency standard unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace; however, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by

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various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge

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and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
- Demonstrate an appropriate level of employability skills
- Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures

- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The knowledge and application of relevant sections of occupational, health and safety legislation, statutory legislation, enterprise/site safety procedures and enterprise/site emergency procedures
  - Preparation and planning of work
  - Removal techniques
  - Maintenance techniques and procedures
  - Installation techniques and procedures
  - Completion of work procedures
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and method and in a variety of

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environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Valves may include high and low pressure and temperature valves that are flanged and bolted; dampers and hydro regulating valves; gate; globe; wafer; uni-flow; plug; ball; knife; rotary; piston (ported); diaphragm; non-return; pinch; pressure relief; regulating; isolating; slide dampers; isolating and regulating blade dampers; gas regulating or isolating dampers; hydro turbine guide vanes; and shutters.

Precision measuring devices may include inside/outside micrometers, verniers,

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RANGE STATEMENT

engineer's rule, dial gauges, depth gauges and feeler gauges.

Testing may include pressure testing (hydraulic and vacuum), blue check.

Valve may control solutions which may include gases; solids; and fluids and chemicals such as caustic soda, chlorine, ammonia, sulphuric acid, sodium hypochlorite, hydrazine, diethylamine, citric acid, hydrofluoric acid, ammonium molydate, trisodium phosphate, hydrogen, nitrogen, carbon dioxide, water, fly-ash, slurry, compressed air, brine, oil, steam (superheated and saturated), hydrogen, propane and carbon dioxide.

Valve drives may include electrical, mechanical, pneumatic, hydraulic or manual.

Work completion details may include plant and maintenance records, job cards, check sheets, on device labelling updates and reporting and/or documenting equipment defects

Work site environment may be affected by nearby plant or processes, e.g. chemical, heat, dust, noise, gas and oil.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1.00 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Maintenance

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UEPMNT304B Maintain mechanical pumps

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to undertake the installation and maintenance of mechanical pumps, compressors and blowers and the installation of which requires no more than basic alignment.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
MEM18006C	Repair and fit engineering components
MEM09002B	Interpret technical drawing
MEM12023A	Perform Engineering Measurements
MEM18001C	Use hand tools
MEM18002B	Use power tools/hand held operations
MEM18003C	Use tools for precision work
MEM18055B	Dismantle, replace and assemble engineering components

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

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Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and prepare for the work	1.1 Work requirements are identified from request/work orders or equivalent and clarified/confirmed with appropriate parties or by site inspection
	1.2 Occupational Health and Safety standards, statutory requirements, relevant Australian standards, codes of practice, manufacturer specifications, environmental requirements and enterprise procedures are identified, applied and monitored throughout the work procedure.
	1.3 Resources required to satisfy the work plan are identified, obtained and inspected for compliance with the job specifications
	1.4 Relevant plans, drawings and texts are selected and interpreted in accordance with the work plan
	1.5 Correct size, type and quantity of materials/components are determined, obtained and inspected for compliance with the job

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ELEMENT	PERFORMANCE CRITERIA	
		specifications
	1.6	Work is planned in detail including sequencing and prioritising and considerations made, where appropriate, for the maintenance of plant security and capacity in accordance with system/site requirements
	1.7	Coordination requirements, including requests for isolations where appropriate, are resolved with others involved, affected or required by the work
	1.8	Potential hazards are identified and prevention and/or control measures are selected in accordance with the work plan and site procedures
	1.9	Work area is prepared in accordance with work requirements and site procedures
	1.10	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of on-the-job training
2 Remove pumps for maintenance	2.1	Required isolations are confirmed where appropriate in accordance with site requirements
	2.2	Pump is disconnected in accordance with the work plan
	2.3	Pump is removed in a manner which will assist in replacement in accordance with the work plan
	2.4	Pump is inspected for abnormalities in accordance with the work plan
3 Maintain pumps	3.1	Maintenance is performed in accordance with manufacturer specifications and site procedures
	3.2	Pump is dismantled for maintenance in accordance with manufacturer specifications and site procedures
	3.3	Sketches are made, data noted and components marked for identification and/or re-assembly in accordance with job requirements and site

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ELEMENT	PERFORMANCE CRITERIA	
		procedures
	3.4	New components are obtained and inspected for compliance with manufacturer specifications
	3.5	Dimensional inspection is performed with precision measuring devices to ensure compliance with specifications and results recorded in accordance with job requirements and site procedures
	3.6	Pump is reassembled applying appropriate principles and techniques in accordance with manufacturer specifications and site requirements
	3.7	Modifications/alterations are undertaken in accordance with site requirements
4 Replace/install pumps	4.1	Site is prepared for pump replacement in accordance with the work plan
	4.2	Pump is replaced in accordance with the work plan and manufacturer specifications
	4.3	Pump is levelled, aligned, coupled and connected in accordance with the work plan
	4.4	All fastenings are torqued in accordance with manufacturer specifications and site requirements
	4.5	Machinery/plant and pump are test run, monitored and adjusted as required in accordance with manufacturer specifications and site requirements
5 Complete the work	5.1	Work is completed and appropriate personnel notified in accordance with site/enterprise requirements
	5.2	Work area is cleared of waste, cleaned, restored and secured in accordance with site/enterprise procedures
	5.3	Plant, tools and equipment are maintained and stored in accordance with site/enterprise

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ELEMENT	PERFORMANCE CRITERIA	
		procedures
	5.4	Work completion details are finalised in accordance with site/enterprise procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of maintaining mechanical pumps.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PM304B Mechanical pumps

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant Environmental, Occupational Health and Safety legislation and regulations
- Pumps types and characteristics
- Technical drawings and manufacturers manuals
- Precision measuring equipment
- Seals and gaskets
- Bearings
- Specialised tools and jigs
- Coupling levelling and alignment
- Rigging and lifting equipment
- Materials and components of pumps
- Fluid dynamics
- Hand and portable power tools
- Protective coatings
- Heating techniques
- Balancing techniques
- Isolation procedures

T2 Specific skills needed to achieve the Performance Criteria:

- Apply Relevant Environmental, Occupational Health and Safety legislation and

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REQUIRED SKILLS AND KNOWLEDGE

regulations

- Identify and use precision measuring equipment
- Apply coupling levelling and alignment techniques
- Manufacture and install seals and gaskets
- Apply fluid dynamics principles
- Install bearings
- Use specialised tools and jigs
- Interpret Technical drawings and manufacturers manuals
- Identify and select materials and components
- Apply data analysis techniques and tools
- Use hand and portable power tools
- Use heat application equipment
- Apply dismantling and reassembling techniques
- Work to defined tolerances
- Recognise worn/damaged components
- Apply effective maintenance procedures
- Communicate effectively.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the range statement of the competency standard unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment	**9.1)**
	Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or in a realistically simulated work environment. It is

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recognised that, in some circumstances, assessment in part or full can occur outside the workplace; however, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and

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Range Statement

- Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
- Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
- Demonstrate an appropriate level of employability skills
- Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures

- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Preparation and planning of work
  - Removal techniques
  - Maintenance techniques and procedures
  - Installation techniques and procedures
  - Completion of work procedures
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

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In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and method and in a variety of environments.

Method of assessment

9.4)

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Pumps may include single stage, centrifugal, screw and gear, positive, non-positive, partial and variable displacement, vane, diaphragm, roots and pistons.

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RANGE STATEMENT

Pump drives may include electrical, internal combustion, hydraulic, pneumatic or steam.

Tools may include micrometers, verniers, dial test indicators, slip gauges, hand tools, hydraulic spanners, customised mandrels, digital height gauges, internal micrometers, depth gauges, air grinders, jigs and fixtures, customised spanners, thermal blankets, induction heaters, thermal crayons, digital thermometers, oxyacetylene gear and appropriate lifting devices.

Plant and equipment may include jigs for dismantling and oxyacetylene heating equipment.

Materials may include liquid nitrogen.

Work completion details may include plant and maintenance records, job cards, check sheets, on device labelling updates and reporting and/or documenting equipment defects.

Work site environment may be affected by nearby plant or processes e.g. chemical, heat, dust, noise and oil.

Isolations can refer to electrical/mechanical or other associated processes.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1.00 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Maintenance

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UEPMNT305B Maintain industrial fans

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to undertake all work required to maintain/overhaul industrial fans and may involve fault finding, diagnosis, repair and could require the removal and replacement of rotating elements with modulating controls.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
MEM18006C	Repair and fit engineering components
MEM09002B	Interpret technical drawing
MEM12023A	Perform Engineering Measurements
MEM18001C	Use hand tools
MEM18002B	Use power tools/hand held operations
MEM18003C	Use tools for precision work
MEM18055B	Dismantle, replace and assemble engineering components

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

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Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and prepare for the work	1.1 Work requirements are identified from request/work orders or equivalent and clarified/confirmed with appropriate parties or by site inspection
	1.2 Occupational Health and Safety standards, statutory requirements, relevant Australian standards, codes of practice, manufacturer specifications, environmental requirements and enterprise procedures are identified, applied and monitored throughout the work procedure
	1.3 Resources required to satisfy the work plan are identified, obtained and inspected for compliance with the job specifications
	1.4 Relevant plans, drawings and texts are selected and interpreted in accordance with the work plan
	1.5 Correct size, type and quantity of materials/components are determined, obtained and inspected for compliance with the job

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ELEMENT	PERFORMANCE CRITERIA	
		specifications
	1.6	Work is planned in detail including sequencing and prioritising and considerations made, where appropriate, for the maintenance of plant security and capacity in accordance with system/site requirements
	1.7	Coordination requirements, including requests for isolations where appropriate, are resolved with others involved, affected or required by the work
	1.8	Potential hazards are identified and prevention and/or control measures are selected in accordance with the work plan and site procedures
	1.9	Work area is prepared in accordance with work requirements and site procedures
	1.10	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and where required, assist in the provision of on-the-job training
2 Remove fan for maintenance	2.1	Required isolations are confirmed, where appropriate, in accordance with site requirements
	2.2	Fans are disconnected in accordance with the work plan
	2.3	Fans are removed in a manner which will assist in replacement in accordance with the work plan
	2.4	Fans are inspected for abnormalities in accordance with the work plan
3 Maintain fans	3.1	Maintenance is performed in accordance with manufacturer specification and site procedures
	3.2	Components are disassembled/assembled and preliminary balance of the equipment is obtained, maintained and adjusted by assembling components of an appropriate weight in accordance with manufacturer/site specifications

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ELEMENT	PERFORMANCE CRITERIA	
	3.3	Sketches are made, data noted and components marked for identification and/or re-assembly in accordance with job requirements and site procedures
	3.4	New components are obtained and inspected for compliance with manufacturer specifications
	3.5	Dimensional inspection is performed with precision measuring devices to ensure compliance with specifications and results recorded in accordance with job requirements and site procedures
	3.6	Fans are reassembled applying appropriate principles and techniques in accordance with manufacturer specifications and site requirements
	3.7	Modifications/alterations are undertaken in accordance with site requirements
4 Replace/install fans	4.1	Site is prepared for fans replacement in accordance with the work plan
	4.2	Fans are replaced in accordance with the work plan and manufacturer specifications
	4.3	Fans are levelled, aligned, coupled and connected in accordance with the work plan
	4.4	All fastenings are torqued in accordance with manufacturer specifications and site requirements
	4.5	Machinery/plant and fans are test run, monitored and adjusted as required in accordance with manufacturer specifications and site requirements
5 Complete the work	5.1	Work is completed and appropriate personnel notified in accordance with site/enterprise requirements
	5.2	Work area is cleared of waste, cleaned, restored and secured in accordance with site/enterprise procedures

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ELEMENT	PERFORMANCE CRITERIA
	5.3 Plant, tools and equipment are maintained and stored in accordance with site/enterprise procedures
	5.4 Work completion details are finalised in accordance with site/enterprise procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of maintaining industrial fans.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PM305B Industrial fans

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant Environmental, Occupational Health and Safety legislation and regulations
- Introduction to and typical arrangements of power production plant
- Fan and motor types and characteristics
- Introduction to and typical arrangements of power production plant
- Motor variable speed drive types and characteristics
- Precision measuring equipment
- Seals and gaskets
- Coupling levelling and alignment
- Rigging and lifting
- Technical drawings and manufacturers manuals
- Hand and power tools
- Protective coatings
- Balancing techniques
- Isolation procedures

T2 Specific skills needed to achieve the Performance Criteria:

- Apply Relevant Environmental, Occupational Health and Safety legislation and regulations

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REQUIRED SKILLS AND KNOWLEDGE

- Identify and use measuring equipment
- Manufacture and install seals and gaskets
- Apply coupling levelling and aligning techniques
- Interpret Technical drawings and manufacturers manuals
- Identify and select materials and components
- Use hand and portable power tools
- Work to defined tolerances
- Dismantle and assemble components
- Apply balancing procedures
- Recognise worn/damaged components
- Communicate effectively.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the range statement of the competency standard unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace; however, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment,

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the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential

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Knowledge and Associated Skills of this unit
- Demonstrate an appropriate level of employability skills
- Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures

- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Removal techniques
  - Maintenance techniques and procedures
  - Installation techniques and procedures
  - Completion of work procedures
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and method and in a variety of environments.

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Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note: Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Fans may include induced draft, forced draft, cooling and exhaust.

Modulating controls may be to guide vanes and impellor blades.

Maintenance may include repair, inspection, modification, balancing, overhaul, lubrication, servicing, test running and identifying and replacing defective components.

Tools may include micrometers, verniers, dial test indicators, slip gauges, hand tools, hydraulic spanners, customised mandrels, digital height gauges, internal micrometers, depth gauges, air grinders, jigs and fixtures, customised spanners, thermal blankets, induction heaters, thermal crayons, digital thermometers, oxyacetylene gear and appropriate lifting devices.

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RANGE STATEMENT

Work completion details may include plant and maintenance records, job cards, check sheets, on device labelling updates and reporting and/or documenting equipment defects.

Work site environment may be affected by nearby plant or processes, e.g. chemical, heat, dust, noise, gas and oil.

Isolations can refer to electrical/mechanical or other associated processes.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1.00 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Maintenance

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UEPMNT307B Maintain industrial screens, strainers and filters

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to undertake the fault finding diagnosis, repair and/or overhaul of industrial screens, strainers and filters.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

Pre-Requisites

Prerequisite Unit(s) **4)**

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Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
MEM18006C	Repair and fit engineering components
MEM09002B	Interpret technical drawing
MEM12023A	Perform Engineering Measurements
MEM18001C	Use hand tools
MEM18002B	Use power tools/hand held operations
MEM18003C	Use tools for precision work
MEM18055B	Dismantle, replace and assemble engineering components

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

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Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and prepare for the work	1.1 Work requirements are identified from request/work orders or equivalent and clarified/confirmed with appropriate parties or by site inspection
	1.2 Occupational Health and Safety standards, statutory requirements, relevant Australian standards, codes of practice, manufacturer specifications, environmental requirements and enterprise procedures are identified, applied and monitored throughout the work procedure
	1.3 Resources required to satisfy the work plan are identified, obtained and inspected for compliance with the job specifications
	1.4 Relevant plans, drawings and texts are selected and interpreted in accordance with the work plan
	1.5 Correct size, type and quantity of materials/components are determined, obtained and inspected for compliance with the job

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ELEMENT	PERFORMANCE CRITERIA	
		specifications
	1.6	Work is planned in detail including sequencing and prioritising and considerations made, where appropriate, for the maintenance of plant security and capacity in accordance with system/site requirements
	1.7	Coordination requirements, including requests for isolations where appropriate, are resolved with others involved, affected or required by the work. plan
	1.8	Potential hazards are identified and prevention and/or control measures are selected in accordance with the work plan and site procedures
	1.9	Work area is prepared in accordance with work requirements and site procedures
	1.10	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of on-the-job training
2 Remove plant/equipment for maintenance	2.1	Required isolations are confirmed where appropriate in accordance with site requirements
	2.2	Screens, strainers and filters are disconnected in accordance with the work plan
	2.3	Screens, strainers and filters are removed in a manner which will assist in replacement in accordance with the work plan
	2.4	Screens, strainers and filters are inspected for abnormalities in accordance with the work plan
3 Maintain plant/equipment	3.1	Equipment isolation and de-pressurisation is confirmed visually and manually, as required in accordance with the job plan and site requirements
	3.2	Plant/equipment components, assemblies or sub-assemblies are identified and prepared for maintenance in accordance with the work plan.

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ELEMENT	PERFORMANCE CRITERIA	
	3.3	Equipment is removed, cleaned and marked for identification in accordance with the job plan and site requirements
	3.4	Faulty items are repaired/overhauled, using appropriate principles, techniques and standards in accordance with the job plan and site requirements
	3.5	Replacement items for installation are selected and inspected in accordance with manufacturer specifications
	3.6	Out of specification modifications/alterations approved by appropriate authority and in accordance with requirements
	3.7	Component failures are identified and probable causes reported using appropriate techniques and equipment in accordance with the job plan
	3.8	Components or sub-assemblies are refitted in accordance with manufacturer specifications and site requirements
	3.9	All fastenings are torqued in accordance with manufacturer specifications and site requirements
4 Replace/install screens, strainers and filters	4.1	Site is prepared for screens, strainers and filters replacement in accordance with the work plan
	4.2	Out of specification modifications/alterations approved by appropriate authority and in accordance with requirements
	4.3	Screens, strainers and filters are replaced in accordance with the work plan and manufacturer specifications
	4.4	Screens, strainers and filters are levelled, aligned and coupled in accordance with the work plan
	4.5	All fastenings are torqued in accordance with manufacturer specifications and site requirements

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ELEMENT	PERFORMANCE CRITERIA	
	4.6	Machinery/plant is test run, monitored and adjusted as required in accordance with manufacturer specifications and site requirements
5 Complete the work	5.1	Work is completed and appropriate personnel notified in accordance with site/enterprise requirements
	5.2	Work area is cleared of waste, cleaned, restored and secured in accordance with site/enterprise procedures
	5.3	Plant, tools and equipment are maintained and stored in accordance with site/enterprise procedures
	5.4	Work completion details are finalised in accordance with site/enterprise procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of maintaining industrial screens, strainers and filters.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PM307B Industrial screens, strainers and filters

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant Environmental, Occupational Health and Safety legislation and regulations
- Relevant plant and equipment, its location
- Technical drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Measuring equipment

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REQUIRED SKILLS AND KNOWLEDGE

- Screen and filter types and characteristics
- Hand and portable power tools
- Specialised tools and jigs
- Node and cathode protection
- levelling and alignment
- Rigging and lifting techniques
- Relevant materials and components
- Balancing procedures
- Communication principles

T2 Specific skills needed to achieve the Performance Criteria:

- Apply Relevant Environmental, Occupational Health and Safety legislation and regulations
- Apply valve levelling and alignment techniques
- Interpret Technical drawings and manufacturers manuals
- Apply levelling and alignment techniques
- Identify and use measuring equipment
- Use hand portable power tools
- Use technical drawings and data
- Dismantle and assemble components
- Apply installation and maintenance procedures
- Communicate effectively

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the range statement of the competency standard unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment	**9.1)**
	Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best

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utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace; however, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline,

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work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:

- Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
- Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
- Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
- Demonstrate an appropriate level of employability skills
- Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures

- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Preparation and planning of work
  - Removal techniques
  - Maintenance techniques and procedures
  - Installation techniques and procedures;
  - Completion of work procedures
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace

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conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and method and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

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RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Screens may include vibratory, rotary, fixed and basket.

Strainers may include Basket, rotary and element.

Filters may include water trap, lube oil filters, cartridge, element, oil purifiers, paper, resin and sand.

Plant may include electrostatic precipitators, economise hopper air conditioner water coolers.

Work completion details may include plant and maintenance records; job cards; check sheets; on device labelling updates and reporting; documenting equipment defects.

Work site environment may be affected by nearby plant or processes e.g. chemical, heat, dust, noise, gas and oil.

Isolations can refer to electrical/mechanical or other associated processes.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1.00 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Maintenance

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UEPMNT308B Maintain conveyors and associated equipment

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to undertake the fault finding, diagnosis and repair, adjustments, exchange of rollers and preparations for belt splicing/repairs.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
MEM18006C	Repair and fit engineering components
MEM09002B	Interpret technical drawing
MEM12023A	Perform Engineering Measurements
MEM18001C	Use hand tools
MEM18002B	Use tools for precision work
MEM18055B	Dismantle, replace and assemble engineering components

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

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Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and prepare for the work	1.1 Work requirements are identified from request/work orders or equivalent and clarified/confirmed with appropriate parties or by site inspection
	1.2 Occupational Health and Safety standards, statutory requirements, relevant Australian standards, codes of practice, manufacturer specifications, environmental requirements and enterprise procedures are identified, applied and monitored throughout the work procedure
	1.3 Resources including tools and equipment required to satisfy the work plan are identified, obtained and inspected for compliance with the job specifications
	1.4 Relevant plans, drawings and texts are selected and interpreted in accordance with the work plan
	1.5 Correct size, type and quantity of materials/components are determined, obtained and inspected for compliance with the job specifications

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ELEMENT		PERFORMANCE CRITERIA	
		1.6	Work is planned in detail including sequencing and prioritising and considerations made, where appropriate, for the maintenance of plant security and capacity in accordance with system/site requirements
		1.7	Coordination requirements, including requests for isolations where appropriate, are resolved with others involved, affected or required by the work
		1.8	Potential hazards are identified and prevention and/or control measures are selected in accordance with the work plan and site procedures
		1.9	Work area is prepared in accordance with work requirements and site procedures
		1.10	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of on-the-job training
2	Remove equipment to facilitate maintenance	2.1	Where appropriate, faulty components and parts are identified and required isolations are confirmed where appropriate in accordance with site requirements
		2.2	Associated equipment is disconnected in accordance with the work plan
		2.3	Associated equipment is removed in a manner which will assist in replacement in accordance with the work plan
		2.4	Conveyors and associated equipment are inspected for abnormalities in accordance with the work plan
3	Maintain conveyors and/or associated equipment	3.1	Belt tensioning equipment is released and secured to facilitate maintenance in accordance with the work plan.
		3.2	Sketches are made, data noted and components marked for identification and/or re-assembly in accordance with manufacturer specifications and

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ELEMENT		PERFORMANCE CRITERIA	
			the work plan.
		3.3	Out of specification modifications/alterations approved in accordance with requirements
		3.4	New components are installed and inspected for compliance with job specifications and prepared for re-assembly in accordance with site requirements.
		3.5	Dimensional inspection is performed using precision measuring devices to determine compliance with the job plan.
		3.6	Machinery/conveyors are levelled, aligned and tensioned in accordance with the job plan and site requirements
4	Replace/install conveyors and/or associated equipment	4.1	Where appropriate, faulty components and parts are identified and site is prepared for conveyors and associated equipment to be replaced in accordance with the work plan
		4.2	Conveyors and associated equipment are replaced in accordance with the work plan and manufacturer specifications
		4.3	Conveyors and associated equipment are levelled, aligned and coupled in accordance with the work plan
		4.4	All fastenings are torqued in accordance with manufacturer specifications and site requirements
		4.5	Conveyors and associated equipment are test run, monitored and adjusted as required in accordance with manufacturer specifications and site requirements
5	Complete the work	5.1	Work is completed and appropriate personnel notified in accordance with site/enterprise requirements
		5.2	Work area is cleared of waste, cleaned, restored and secured in accordance with site/enterprise procedures

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ELEMENT	PERFORMANCE CRITERIA
	5.3 Plant, tools and equipment are maintained and stored in accordance with site/enterprise procedures
	5.4 Work completion details are finalised in accordance with site/enterprise procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of maintaining conveyors and associated equipment.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PM308B Conveyors and associated equipment

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant Environmental, Occupational Health and Safety legislation and regulations
- Relevant plant and equipment, its location
- Technical drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Conveyor types and their operating principles
- Conveyor tracking principles
- Conveyor tensioning techniques
- Conveyor operations/systems
- Precision measuring equipment
- Hand and portable power tools
- Specialised tools and jigs
- Levelling and alignment principles
- Rigging and lifting techniques
- Balancing procedures
- Isolation procedures

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REQUIRED SKILLS AND KNOWLEDGE

T2 Specific skills needed to achieve the Performance Criteria:

- Apply Relevant Environmental, Occupational Health and Safety legislation and regulations
- Apply valve levelling and alignment techniques
- Interpret Technical drawings and manufacturers manuals
- Identify and use measuring equipment
- Use hand and portable power tools
- Select and use specialised tools and jibs
- Apply levelling and alignment techniques
- Track, align and tension conveyors and associated equipment
- Dismantle, exchange and reassemble components and parts
- Communicate effectively.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the range statement of the competency standard unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment	**9.1)**

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Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace; however, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also

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comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Preparation and planning of work
  - Removal techniques
  - Maintenance techniques and procedures
  - Installation techniques and procedures
  - Completion of work procedures
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials

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to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and method and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note: Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

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RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Conveyors may be fixed, shuttle or multi-directional, rubber belts or drag link.

Associated plant/components may include rollers, idlers, pulleys, self tracking devices, scrapers, skirting rubbers, chutes, magnetic detectors, wear plates, ploughs, sprays for dust suppression, anti-slip devices, clipping rubber belts and flop gates.

Work completion details may include plant and maintenance records, job cards, check sheets, on device labelling updates and reporting and/or documenting equipment defects.

Work site environment may be affected by nearby plant or processes, e.g. chemical, heat, dust, noise, gas and oil.

Isolations can refer to electrical/mechanical or other associated processes.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1.00 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Maintenance

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UEPMNT309B Maintain material feeders

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to undertake the in-service fault finding, diagnosis and out of service inspection (internal/external), repairs and/or overhaul of material feeders.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
MEM18006C	Repair and fit engineering components
MEM09002B	Interpret technical drawing
MEM12023A	Perform Engineering Measurements
MEM18001C	Use hand tools
MEM18002B	Use power tools/hand held operations
MEM18003C	Use tools for precision work
MEM18055B	Dismantle, replace and assemble engineering components

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

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Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and prepare for the work	1.1 Work requirements are identified from request/work orders or equivalent and clarified/confirmed with appropriate parties or by site inspection
	1.2 Occupational Health and Safety standards, statutory requirements, relevant Australian standards, codes of practice, manufacturers' specifications, environmental requirements and enterprise procedures are identified, applied and monitored throughout the work procedure
	1.3 Resources required to satisfy the work plan are identified, obtained and inspected for compliance with the job specifications
	1.4 Relevant plans, drawings and texts are selected and interpreted in accordance with the work plan
	1.5 Correct size, type and quantity of materials/components are determined, obtained and inspected for compliance with the job

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ELEMENT		PERFORMANCE CRITERIA	
			specifications
		1.6	Work is planned in detail including sequencing and prioritising and considerations made, where appropriate, for the maintenance of plant security and capacity in accordance with system/site requirements
		1.7	Coordination requirements, including requests for isolations where appropriate, are resolved with others involved, affected or required by the work
		1.8	Potential hazards are identified and prevention and/or control measures are selected in accordance with the work plan and site procedures
		1.9	Work area is prepared in accordance with work requirements and site procedures
		1.10	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of on-the-job training
2	Conduct in-service testing	2.1	In-service tests are carried out in accordance with the work plan
		2.2	Faults are located using appropriate tools, equipment and testing techniques, being mindful of personnel safety and plant integrity
		2.3	Testing and fault finding results are analysed to establish suitable repairs or ascertain serviceability
3	Remove equipment to facilitate maintenance	3.1	Required isolations are confirmed where appropriate in accordance with site requirements
		3.2	Material feeders are disconnected in accordance with the work plan
		3.3	Material feeders are removed in a manner which will assist in replacement in accordance with the work plan

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ELEMENT	PERFORMANCE CRITERIA	
	3.4	Material feeders are inspected for abnormalities in accordance with the work plan
4 Maintain material feeders	4.1	Maintenance is performed in accordance with manufacturer specifications and site requirements
	4.2	Components or sub-assemblies are dismantled, cleaned and examined to verify tolerances, using correct and appropriate techniques and procedures to determine whether to replace, overhaul or repair in accordance with the work plan
	4.3	Equipment is dismantled in a manner that will facilitate re-assembly in accordance with the work plan
	4.4	Component parts are clearly marked for identification in accordance with job requirements
	4.5	Components are laid out in preparation for re-assembly in accordance with manufacturer drawings/specifications
	4.6	New components are inspected for compliance with manufacturer specifications and prepared for assembly in accordance with the job plan and site requirements
	4.7	Modifications/alterations are undertaken in accordance with site requirements
	4.8	Components are reassembled in accordance with work plan and site requirements
5 Replace/install feeders	5.1	Site is prepared for material feeders to be replaced in accordance with the work plan
	5.2	All fastenings are torqued in accordance with manufacturer specifications and site requirements
	5.3	Material feeders are test run and monitored as required in accordance with manufacturer specifications and site requirements

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ELEMENT	PERFORMANCE CRITERIA	
6 Complete the work	6.1	Work is completed and appropriate personnel notified in accordance with site/enterprise requirements
	6.2	Work area is cleared of waste, cleaned, restored and secured in accordance with site/enterprise procedures
	6.3	Plant, tools and equipment are maintained and stored in accordance with site/enterprise procedures
	6.4	Work completion details are finalised in accordance with site/enterprise procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of maintaining material feeders.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PM309B Material feeders

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant Environmental, Occupational Health and Safety legislation and regulations
- Relevant plant and equipment, its location
- Technical drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Gearboxes
- Seals and gaskets
- Feeder types and operating principles
- Precision measuring equipment
- Hand and power tools
- Specialised tools and jigs

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REQUIRED SKILLS AND KNOWLEDGE

- levelling and alignment principles
- Rigging and lifting techniques
- Relevant materials and components
- Isolation procedures
- Balancing procedures

T2 Specific skills needed to achieve the Performance Criteria:

- Apply Relevant Environmental, Occupational Health and Safety legislation and regulations
- Apply levelling and alignment techniques
- Interpret Technical drawings and manufacturers manuals
- Manufacture gaskets and seals
- Identify and use precision measuring equipment
- Apply feeder operating principles when setting equipment
- Use hand and portable power tools
- Use technical drawings and data
- Apply data analysis techniques
- Select and use specialised tools and jigs
- Identify and select materials and components
- Adjust feeder for desired material feed rate
- Dismantle and reassemble components
- Communicate effectively.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the range statement of the competency standard unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment	**9.1)**
	Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best

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utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace; however, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

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Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Preparation and planning of work
  - Removal techniques
  - Maintenance techniques and procedures
  - Installation techniques and procedures
  - Completion of work procedures
  - In service test procedures
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific **9.3)**

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resources for assessment

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and method and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note: Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with

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allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Feeders may include vibro, apron, rotary, table type and belt type (gravimetric and volumetric).

Feeder processes may involve coal and hot air.

Metering techniques may include electromagnetic, elliptical and variable speed.

Work completion details may include plant and maintenance records, job cards, check sheets, on device labelling updates and reporting and/or documenting equipment defects.

Work site environment may be affected by nearby plant or processes, e.g. chemical, heat, dust, noise, gas and oil.

Isolations can refer to electrical/mechanical or other associated processes.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1.00 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Maintenance

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UEPMNT310B Maintain material crushers

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to undertake the in-service fault finding, diagnosis and out of service inspection, repairs, and/or overhauls of material crushers and would involve roll/door assemblies.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
MEM18006C	Repair and fit engineering components
MEM09002B	Interpret technical drawing
MEM12023A	Perform Engineering Measurements
MEM18001C	Use hand tools
MEM18002B	Use power tools/hand held operations
MEM18003C	Use tools for precision work
MEM18055B	Dismantle, replace and assemble engineering components

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

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Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and prepare for the work	1.1 Work requirements are identified from request/work orders or equivalent and clarified/confirmed with appropriate parties or by site inspection
	1.2 Occupational Health and Safety standards, statutory requirements, relevant Australian standards, codes of practice, manufacturer specifications, environmental requirements and enterprise procedures are identified, applied and monitored throughout the work procedure
	1.3 Resources required to satisfy the work plan are identified, obtained and inspected for compliance with the job specifications
	1.4 Relevant plans, drawings and texts are selected and interpreted in accordance with the work plan
	1.5 Correct size, type and quantity of materials/components are determined, obtained and inspected for compliance with the job

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ELEMENT		PERFORMANCE CRITERIA	
			specifications
		1.6	Work is planned in detail including sequencing and prioritising and considerations made, where appropriate, for the maintenance of plant security and capacity in accordance with system/site requirements
		1.7	Coordination requirements, including requests for isolations where appropriate, are resolved with others involved, affected or required by the work
		1.8	Potential hazards are identified and prevention and/or control measures are selected in accordance with the work plan and site procedures
		1.9	Work area is prepared in accordance with work requirements and site procedures
		1.10	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of on-the-job training
2	Conduct in-service testing	2.1	In-service tests are carried out in accordance with the work plan
		2.2	Faults are located using appropriate tools, equipment and testing techniques, being mindful of personnel safety and plant integrity
		2.3	Testing and fault finding results are analysed to establish suitable repairs or ascertain serviceability
3	Remove equipment to facilitate maintenance	3.1	Required isolations are confirmed where appropriate in accordance with site requirements
		3.2	Material crushers are disconnected in accordance with the work plan
		3.3	Material crushers are removed in a manner which will assist in replacement in accordance with the work plan

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ELEMENT	PERFORMANCE CRITERIA	
	3.4	Material crushers are inspected for abnormalities in accordance with the work plan
4 Maintain material crushers	4.1	Components or sub-assemblies are dismantled, cleaned and examined to verify tolerances using appropriate techniques and procedures to determine the need to replace, overhaul or repair in accordance with the work plan
	4.2	Sketches are made, data noted and components marked for identification and/or re-assembly and overhaul in accordance with the work plan and site requirements
	4.3	Dimensional inspection is performed using precision measuring devices to determine compliance with relevant drawings/ specifications and in accordance with the work plan
	4.4	New components are inspected for compliance with manufacturer specifications and prepared for assembly in accordance with the work plan and site requirements
	4.5	Components are weighed, measured and recorded in accordance with the work plan and site requirements
	4.6	Components are reassembled and preliminary balance of the equipment is obtained, maintained and adjusted by assembling components sequentially and of appropriate weight in accordance with the work plan
	4.7	Plant and machinery is adjusted using appropriate techniques in accordance with manufacturer/site tolerances
	4.8	All fastenings are torqued in accordance with manufacturer specifications
	4.9	Components are levelled and aligned, using appropriate tools and procedures in accordance with the work plan and site requirements
5 Replace/install	5.1	Site is prepared for material crushers to be

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ELEMENT	PERFORMANCE CRITERIA	
material crushers		replaced in accordance with the work plan
	5.2	Material crushers are replaced in accordance with the work plan and manufacturer specifications
	5.3	Alterations/corrections are undertaken in accordance with requirements/enterprise procedures
	5.4	Material crushers are levelled, aligned and coupled in accordance with the work plan.
	5.5	All fastenings are torqued in accordance with manufacturer specifications and site requirements
	5.6	Material crushers are test run and monitored as required in accordance with manufacturer specifications and site requirements
6 Complete the work	6.1	Work is completed and appropriate personnel notified in accordance with site/enterprise requirements
	6.2	Work area is cleared of waste, cleaned, restored and secured in accordance with site/enterprise procedures
	6.3	Plant, tools and equipment are maintained and stored in accordance with site/enterprise procedures
	6.4	Work completion details are finalised in accordance with site/enterprise procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of maintaining material crushers.

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REQUIRED SKILLS AND KNOWLEDGE

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PM310B Material crushers

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant Environmental, Occupational Health and Safety legislation and regulations
- Relevant plant and equipment, its location
- Technical drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Crusher types and operating principles
- Measuring equipment
- Hand and portable power tools
- Specialised tools and jigs
- Levelling and alignment principles
- Rigging and lifting techniques
- Balancing procedures
- Lubrication systems

T2 Specific skills needed to achieve the Performance Criteria:

- Apply Relevant Environmental, Occupational Health and Safety legislation and regulations
- Apply levelling and alignment techniques
- Interpret Technical drawings and manufacturers manuals
- Identify and use measuring equipment
- Use hand and portable power tools
- Select and use specialised tools and jigs
- Identify and select materials and components
- Test, adjust, replace and overhaul crushers for desired material sizing
- Dismantle and reassemble components
- Communicate effectively.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the range statement of

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EVIDENCE GUIDE

the competency standard unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment 9.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace; however, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be ‘rich’ in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its ‘richness’. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence 9.2)

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required to demonstrate competency in this unit

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement OH&S workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Preparation and planning of work
  - Removal techniques
  - Identifying faults
  - Conducting in service testing
  - Maintenance techniques and procedures
  - Installation techniques and procedures
  - Completion of work procedures
  - In service test procedures
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above

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listed items.

Context of and specific resources for assessment **9.3)**

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and method and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note: Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with **9.5)**

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other units

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Crusher types may include impact, ball mills, bowl mills, hammer, jaw crushers, pulverisers, rotary breaker, roller crusher and tines.

Details of maintenance may be clarified by diagnosis and work place inspection.

Maintenance may include repair, inspection, modification, overhaul, lubrication, servicing and test running.

Work completion details may include plant and maintenance records, job cards, check sheets, on device labelling updates and reporting and/or documenting equipment defects.

Work site environment may be affected by nearby plant or processes, e.g. chemical, heat, dust, noise, gas and oil.

Isolations can refer to electrical/mechanical or other associated processes.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1.00 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

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Competency Field 11)

Maintenance

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UEPMNT311B Maintain fuel transport equipment

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to conduct the installation and repair/overhaul of fuel carriage/delivery and associated systems.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

Pre-Requisites

Prerequisite Unit(s) **4)**

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Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
MEM18006C	Repair and fit engineering components
MEM09002B	Interpret technical drawing
MEM12023A	Perform Engineering Measurements
MEM18001C	Use hand tools
MEM18002B	Use power tools/hand held operations
MEM18003C	Use tools for precision work
MEM18055B	Dismantle, replace and assemble engineering components

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

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Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and prepare for the work	1.1 Work requirements are identified from request/work orders or equivalent and clarified/confirmed with appropriate parties or by site inspection
	1.2 Occupational Health and Safety standards, statutory requirements, relevant Australian standards, codes of practice, manufacturer specifications, environmental requirements and enterprise procedures are identified, applied and monitored throughout the work procedure
	1.3 Resources required to satisfy the work plan are identified, obtained and inspected for compliance with the job specifications
	1.4 Relevant plans, drawings and texts are selected and interpreted in accordance with the work plan
	1.5 Correct size, type and quantity of materials/components are determined, obtained and inspected for compliance with the job

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ELEMENT		PERFORMANCE CRITERIA	
			specifications
		1.6	Work is planned in detail including sequencing and prioritising and considerations made, where appropriate, for the maintenance of plant security and capacity in accordance with system/site requirements
		1.7	Coordination requirements, including requests for isolations where appropriate, are resolved with others involved, affected or required by the work
		1.8	Potential hazards are identified and prevention and/or control measures are selected in accordance with the work plan and site procedures
		1.9	Work area is prepared in accordance with work requirements and site procedures
		1.10	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of on-the-job training
2	Remove systems and associated equipment	2.1	Required isolations are confirmed where appropriate in accordance with site requirements
		2.2	Fuel transport systems are disconnected in accordance with the work plan
		2.3	Fuel transport systems are removed in a manner which will assist in replacement in accordance with the work plan
		2.4	Fuel transport systems are inspected for abnormalities in accordance with the work plan
3	Maintain fuel delivery systems	3.1	Maintenance is performed in accordance with the work place and site procedures
		3.2	Equipment is dismantled in a manner that will facilitate re-assembly in accordance with the work plan
		3.3	Faulty components are replaced in accordance

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ELEMENT	PERFORMANCE CRITERIA	
		with the work plan and site requirements
	3.4	Equipment is reassembled in accordance with the work plan and site requirements
4 Replace systems and associated equipment	4.1	Site is prepared for fuel transport systems to be replaced in accordance with the work plan
	4.2	Fuel transport systems are replaced in accordance with the work plan and manufacturer specifications
	4.3	Fuel transport systems are test run and monitored as required in accordance with manufacturer specifications and site requirements
5 Complete the work	5.1	Work is completed and appropriate personnel notified in accordance with site/enterprise requirements
	5.2	Work area is cleared of waste, cleaned, restored and secured in accordance with site/enterprise procedures
	5.3	Plant, tools and equipment are maintained and stored in accordance with site/enterprise procedures
	5.4	Work completion details are finalised in accordance with site/enterprise procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of maintaining fuel transport equipment.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

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REQUIRED SKILLS AND KNOWLEDGE

KS01-PM311B Fuel transport equipment

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant Environmental, Occupational Health and Safety legislation and regulations
- Relevant plant and equipment, its location
- Technical drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Fuel transport systems
- Fuel and Gas conditioning equipment types and characteristics
- Appropriate tools and jigs
- Measuring equipment
- Levelling and aligning principles
- Rigging and lifting equipment
- Hand and portable power tools
- Isolation procedures
- Gaskets and seals
- Pipe bending principles

T2 Specific skills needed to achieve the Performance Criteria:

- Apply Relevant Environmental, Occupational Health and Safety legislation and regulations
- Apply levelling and alignment techniques
- Interpret Technical drawings and manufacturers manuals
- Identify and use precision measuring equipment
- Use hand and portable power tools
- Select and use appropriate tools and jigs
- Identify and select relevant materials and components
- Select and use gaskets and seals
- Apply installation and maintenance procedures
- Communicate effectively.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the range statement of the competency standard unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this unit and shall be used in

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EVIDENCE GUIDE

conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace; however, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be ‘rich’ in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its ‘richness’. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in **9.2)**

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this unit

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Preparation and planning of work
  - Removal techniques
  - Maintenance techniques and procedures
  - Installation techniques and procedures
  - Completion of work procedures
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific **9.3)**

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resources for assessment

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and method and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note: Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with

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allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Fuel delivery systems may include gas, fuel oil and coal transport systems.

Plant may include pumping skids, conditioning equipment, pressure reducing equipment.

Equipment pipe work, pumps, heaters, pressure reducing valves, safety valve, riffle boxes, burners and ducting.

Associated systems may include products of combustion disposal.

Fuel may include pulverised fuel, fuel oil and gas.

Work completion details may include plant and maintenance records, job cards, check sheets, on device labelling updates and reporting and/or documenting equipment defects.

Work site environment may be affected by nearby plant or processes, e.g. chemical, heat, dust, noise, gas and oil.

Isolations can refer to electrical/mechanical or other associated processes.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1.00 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Maintenance

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UEPMNT312B Maintain industrial pressure vessels

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to maintain the boiler pressure parts, pressure vessels and associated components

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

Pre-Requisites

Prerequisite Unit(s) **4)**

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Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
MEM18006C	Repair and fit engineering components
MEM09002B	Interpret technical drawing
MEM12023A	Perform Engineering Measurements
MEM18001C	Use hand tools
MEM18002B	Use power tools/hand held operations
MEM18003C	Use tools for precision work
MEM18055B	Dismantle, replace and assemble engineering components

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

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Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and prepare for the work	1.1 Work requirements are identified from request/work orders or equivalent and clarified/confirmed with appropriate parties or by site inspection
	1.2 Occupational Health and Safety standards, statutory requirements, relevant Australian standards, codes of practice, manufacturers' specifications, environmental requirements and enterprise procedures are identified, applied and monitored throughout the work procedure
	1.3 Resources required to satisfy the work plan are identified, obtained and inspected for compliance with the job specifications
	1.4 Relevant plans, drawings and texts are selected and interpreted in accordance with the work plan
	1.5 Correct size, type and quantity of materials/components are determined, obtained and inspected for compliance with the job

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ELEMENT		PERFORMANCE CRITERIA	
			specifications
		1.6	Work is planned in detail including sequencing and prioritising and considerations made, where appropriate, for the maintenance of plant security and capacity in accordance with system/site requirements
		1.7	Coordination requirements, including requests for isolations where appropriate, are resolved with others involved, affected or required by the work
		1.8	Potential hazards are identified and prevention and/or control measures are selected in accordance with the work plan and site procedures
		1.9	Work area is prepared in accordance with work requirements and site procedures
		1.10	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of on-the-job training
2	Remove associated equipment to facilitate maintenance	2.1	Equipment isolation and depressurisation is confirmed visually and manually, as required in accordance with the work plan
		2.2	Pressure vessels are disconnected in accordance with the work plan
		2.3	Pressure vessel associated equipment is removed in a manner which will assist in replacement in accordance with the work plan
		2.4	Pressure vessel is inspected for abnormalities in accordance with the work plan
3	Dismantle and maintain pressure vessel	3.1	Hazardous material is identified and arrangements made for clearance from work site in accordance with statutory requirements
		3.2	Internal and external components are systematically dismantled, marked and recorded in accordance with work plan

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ELEMENT		PERFORMANCE CRITERIA	
		3.3	Components are refurbished, catalogued and stored for re-assembly in accordance with work plan and manufacturer specifications
		3.4	Gasket and seal requirements are assessed, manufactured or obtained in accordance with the work plan and manufacturer specifications
		3.5	Vessel mountings are maintained as required in accordance with the work plan and manufacturer specifications
		3.6	Internal piping or tubing is tested and expanded, or replaced as required in accordance with the work plan and manufacturer specifications
4	Reassemble pressure vessel	4.1	Internal/external components are systematically reassembled in accordance with the work plan and manufacturer specifications
		4.2	Associated equipment is aligned and replaced in accordance with the work plan
		4.3	Fastenings are torqued in accordance with specifications and the work plan
		4.4	Vessel is pressure tested, monitored and adjusted if required in accordance with the work plan and site/statutory requirements
5	Complete the work	5.1	Work is completed and appropriate personnel notified in accordance with site/enterprise requirements
		5.2	Work area is cleared of waste, cleaned, restored and secured in accordance with site/enterprise procedures
		5.3	Plant, tools and equipment are maintained and stored in accordance with site/enterprise procedures
		5.4	Work completion details are finalised in accordance with site/enterprise procedures

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of maintaining industrial pressure vessels.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PM312B Industrial pressure vessels

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant Environmental, Occupational Health and Safety legislation and regulations
- Relevant plant and equipment, its location
- Technical drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Hand and portable power tools
- Gaskets and seals
- Non-destructive testing
- Pressure system characteristics
- Rigging and lifting
- Levelling and aligning principles
- Valves and pressure system components
- Isolation procedures
- Communication principles

T2 Specific skills needed to achieve the Performance Criteria:

- Apply Relevant Environmental, Occupational Health and Safety legislation and regulations
- Apply levelling and alignment techniques
- Interpret Technical drawings and manufacturers manuals
- Manufacture and install gaskets/seals
- Work safely on pressurised systems
- Work on valves and mountings
- Identify/repair/install pressure system components
- Use hand and portable power tools
- Select and use specialised tools and jigs
- Dismantle and reassemble components
- Apply non-destructive

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REQUIRED SKILLS AND KNOWLEDGE

- Data analysis techniques
- Communicate effectively.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the range statement of the competency standard unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace; however, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be ‘rich’ in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its ‘richness’. Some skills are more critical to

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safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Preparation and planning of work

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- Removal techniques
- Maintenance techniques and procedures
- Installation techniques and procedures
- Completion of work procedures
- Testing procedures
- Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and method and in a variety of environments.

Method of assessment

9.4)

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires

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that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Pressure vessels may include air/steam receivers, boilers, HP and LP heaters, condensers, ash transport vessels, heat exchangers and tanks.

Associated equipment may include valves, inspection plates, drains, cladding/insulation and pipe work.

Potential hazards may include materials within pressure vessels.

Work completion details may include plant and maintenance records, job cards, check sheets, on device labelling updates and reporting and/or documenting equipment defects.

Work site environment may be affected by nearby plant or processes, e.g. chemical, heat, dust, noise, gas and oil.

Isolations can refer to electrical/mechanical or other associated processes.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1.00 Preliminary Information and Glossaries.

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Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Maintenance

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UEPMNT313B Maintain internal combustion engines

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to conduct maintenance and major overhauls of fixed or pad mounted internal combustion engines.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to occupational health and safety.

Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

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Prerequisite Unit(s) **4)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
MEM18006C	Repair and fit engineering components
MEM09002B	Interpret technical drawing
MEM12023A	Perform Engineering Measurements
MEM18001C	Use hand tools
MEM18002B	Use power tools/hand held operations
MEM18003C	Use tools for precision work
MEM18055B	Dismantle, replace and assemble engineering components

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

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Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and prepare for the work	1.1 Work requirements are identified from request/work orders or equivalent and clarified/confirmed with appropriate parties or by site inspection
	1.2 Occupational Health and Safety standards, statutory requirements, relevant Australian standards, codes of practice, manufacturers' specifications, environmental requirements and enterprise procedures are identified, applied and monitored throughout the work procedure
	1.3 Resources required to satisfy the work plan are identified, obtained and inspected for compliance with the job specifications
	1.4 Relevant plans, drawings and texts are selected and interpreted in accordance with the work plan
	1.5 Correct size, type and quantity of materials/components are determined, obtained and inspected for compliance with the job specifications

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ELEMENT		PERFORMANCE CRITERIA	
		1.6	Work is planned in detail including sequencing and prioritising and considerations made, where appropriate, for the maintenance of plant security and capacity in accordance with system/site requirements
		1.7	Coordination requirements, including requests for isolations where appropriate, are resolved with others involved, affected or required by the work
		1.8	Potential hazards are identified and prevention and/or control measures are selected in accordance with the work plan and site procedures
		1.9	Work area is prepared in accordance with work requirements and site procedures
		1.10	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of on-the-job training
2	Assess engine condition	2.1	Engine is run and components are assessed visually and/or aurally to determine condition of engine under load in accordance with the work plan
		2.2	Engine condition is tested whilst under load using appropriate test equipment and procedures according to manufacturer specifications and the work plan
3	Remove auxiliary systems	3.1	Required isolations are confirmed where appropriate in accordance with enterprise/site procedures
		3.2	Auxiliary systems are removed, marked and labelled to facilitate replacement in accordance with the work plan
		3.3	Load device is uncoupled and removed in accordance with the work plan
4	Overhaul/maintain	4.1	Engine is systematically dismantled and component parts are clearly marked for

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ELEMENT	PERFORMANCE CRITERIA	
engine		identification in accordance with the work plan
	4.2	Engine components are examined and dimensional inspection is performed to determine conformance to manufacturer specifications
	4.3	Faulty components are replaced in accordance with manufacturer specifications
	4.4	Engine components are reassembled and necessary adjustments made in accordance with manufacturer specifications and enterprise requirements
5 Replace auxiliary systems	5.1	Load device is coupled in accordance with manufacturer specifications and enterprise requirements
	5.2	Auxiliary equipment is maintained as required in accordance with manufacturer specifications and the work plan
	5.3	Auxiliary equipment is aligned and installed in accordance with manufacturer specifications and the work plan
	5.4	Engine is started and function tested in accordance with manufacturer specifications and enterprise requirements
	5.5	Engine operating characteristics are monitored, recorded and adjustments made as required to obtain optimum performance in accordance with manufacturer specifications and enterprise requirements
	5.6	Where appropriate auxiliary equipment and/or components are overhauled in accordance with manufacturer specifications and enterprise requirements
6 Complete the work	6.1	Work is completed and appropriate personnel notified in accordance with site/enterprise requirements
	6.2	Work area is cleared of waste, cleaned, restored and secured in accordance with site/enterprise

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ELEMENT	PERFORMANCE CRITERIA	
		procedures
	6.3	Plant, tools and equipment are maintained and stored in accordance with site/enterprise procedures
	6.4	Work completion details are finalised in accordance with site/enterprise procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of maintaining internal combustion engines.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PM313B Internal combustion engines

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant Environmental, Occupational Health and Safety legislation and regulations
- Relevant plant and equipment, its location
- Technical drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Hand and portable power tools
- Precision measuring equipment
- Rigging and lifting
- Specialised tools and jigs
- Levelling and aligning
- Data recording techniques
- Diagnostic and testing techniques
- Gaskets and seals
- Diesel fuel injection systems
- Governor systems
- Non-destructive testing

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REQUIRED SKILLS AND KNOWLEDGE

- Torqueing techniques
- Pumps (gear and centrifugal)
- Speed control mechanisms
- Balancing and vibration analysis
- Maintenance procedures
- Dismantling and reassembling techniques

T2 Specific skills needed to achieve the Performance Criteria:

- Apply Relevant Environmental, Occupational Health and Safety legislation and regulations
- Apply levelling and alignment techniques
- Interpret Technical drawings and manufacturers manuals
- Select resources Inspect and identify correct materials, tools and components
- Apply dismantling techniques to work requirements
- Apply re-assembly techniques to work requirements
- Apply repair techniques
- Apply maintenance techniques
- Observe isolation procedures
- Use hand and portable power tools
- Use precise measuring equipment
- Use rigging and lifting equipment
- Use specialised tools and jigs
- Diagnose and test
- Manufacture gaskets and seals
- Inspect, scrape and blue-check bearings
- Identify hazardous materials
- Apply torqueing techniques
- Apply data recording techniques
- Communicate effectively.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the range statement of the competency standard unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

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Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace; however, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be ‘rich’ in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its ‘richness’. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit **9.2)**

Before the critical aspects of evidence are considered all pre-requisites shall be met.

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Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Competence is demonstrated in the context of provision to employees of clear directions and information and work instructions
  - Evidence of knowledge of significant hazards in the workplace is required
  - Evidence of understanding of symbols used for Occupational Health and Safety signs is required
  - Competence may need to be assessed in conjunction with units relating to communication competencies, particularly those relating to information provision.
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items

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Context of and specific resources for assessment **9.3)**

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and method and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

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There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Internal combustion engines may refer to medium speed diesels, high speed diesels, petrol engines, gas engines or dual fuel (gas/diesel) powered engines.

Engine auxiliary systems may include cooling systems, lubrication systems, fuel systems and induction and exhaust systems.

Engine components may include bearings (shell and white metal) pistons, cylinders, valves, cams, lifters, springs, timing gear, crankshaft, pumps, gaskets and seals, coolers, filters and governors.

Measuring equipment may include micrometers, verniers (internal/external) dial indicators, bore gauges, depth and height gauges and optical fibre scope.

Test equipment may include pressure and vacuum gauges, gas analysers, timing light, injector tester and dyno test equipment.

Running checks may include cylinder peak pressure, exhaust gas temperature, lube oil flow checks and fuel injection timing.

Re-assembly techniques may include crankshaft deflections, advanced levelling and alignment.

Work completion details may include plant and maintenance records, job cards, check sheets, on device labelling updates and reporting and/or documenting equipment defects.

Work site environment may be affected by nearby plant or processes, e.g. chemical, heat, dust, noise, gas and oil.

Isolations can refer to electrical/mechanical or other appropriate processes.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1.00 Preliminary Information and Glossaries.

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Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Maintenance

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UEPMNT314B Maintain hydro turbines

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required for the removal from service and overhaul of hydro turbines.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to OH&S.

Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only

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Prerequisite Unit(s) **4)**

after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and prepare for the work	1.1 Work requirements are identified from request/work orders or equivalent and clarified/confirmed with appropriate parties or by site inspection
	1.2 Occupational Health and Safety standards, statutory requirements, relevant Australian standards, codes of practice, manufacturers' specifications, environmental requirements and enterprise procedures are identified, applied and monitored throughout the work procedure
	1.3 Resources required to satisfy the work plan are identified, obtained and inspected for compliance with the job specifications
	1.4 Relevant plans, drawings and texts are selected and interpreted in accordance with the work plan
	1.5 Correct size, type and quantity of materials/components are determined, obtained and inspected for compliance with the job specifications
	1.6 Work is planned in detail including sequencing and prioritising and considerations made, where appropriate, for the maintenance of plant security and capacity in accordance with system/site requirements
	1.7 Coordination requirements, including requests for isolations where appropriate, are resolved with others involved, affected or required by the work
	1.8 Potential hazards are identified and prevention and/or control measures are selected in accordance with the work plan and site procedures
	1.9 Work area is prepared in accordance with work requirements and site procedures
	1.10 Where appropriate, the teams and individuals roles and responsibilities within the team are

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ELEMENT		PERFORMANCE CRITERIA	
			identified and, where required, assist in the provision of the on-the-job training
2	Disassemble turbine	2.1	Required isolations are confirmed where appropriate in accordance with enterprise/site procedures
		2.2	Turbine is disassembled in accordance with manufacturer specifications and work requirements
		2.3	Turbine components are removed in appropriate priority in accordance with manufacturer specifications and work requirements
		2.4	Disassembly is carried out in a manner that will facilitate assembly in accordance with the work plan
		2.5	Components are measured and clearances taken to determine conformity to manufacturer limits, and to ensure assembly is in accordance with manufacturer specifications
		2.6	Measurements and clearances are recorded in accordance with manufacturer specifications and work requirements.
3	Inspect turbine components	3.1	Components are cleaned and inspected in accordance with the work plan
		3.2	Faults are identified and recorded in accordance with the work plan
		3.3	New components are inspected for compliance to manufacturer specifications and work requirements
		3.4	Components are prepared for assembly in accordance with the work plan
4	Repair turbine/ components	4.1	Repairs are carried out in accordance with the work plan.
		4.2	Repairs are tested and results analysed to ensure conformance to specifications and in accordance with the work plan.

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ELEMENT	PERFORMANCE CRITERIA	
	4.3	Data from testing is recorded in accordance with the work plan and enterprise/site procedures
5 Complete the work	5.1	Work is completed and appropriate personnel notified in accordance with site/enterprise requirements
	5.2	Work area is cleared of waste, cleaned, restored and secured in accordance with site/enterprise procedures
	5.3	Plant, tools and equipment are maintained and stored in accordance with site/enterprise procedures
	5.4	Work completion details are finalised in accordance with site/enterprise procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of maintaining hydro turbines.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PM314B Hydro turbines

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant Environmental, Occupational Health and Safety legislation and regulations
- Relevant plant and equipment, its location
- Technical drawings and manufacturers manuals
- Introduction to and typical arrangements of hydro power production plant
- Hydro Turbines types and characteristics
- Hydro Turbines support equipment types and characteristics
- Hand and portable power tools
- Fluid power control principles

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REQUIRED SKILLS AND KNOWLEDGE

- Precision measuring equipment
- Specialised tools and jigs
- Levelling and aligning techniques
- Diagnostic and testing techniques
- Protective coatings
- Gaskets and seals
- Transmissions/couplings
- Valves
- Fluid power systems
- Pipe work
- Torqueing techniques
- Data recording techniques
- Isolation procedures
- Rigging and lifting equipment
- Communication principles

T2 Specific skills needed to achieve the Performance Criteria:

- Apply Relevant Environmental, Occupational Health and Safety legislation and regulations
- Apply levelling and alignment techniques
- Interpret Technical drawings and manufacturers manuals
- Use hand and portable power tools
- Use precision measuring equipment
- Use rigging and lifting equipment
- Use specialised tools and jigs
- Apply levelling and aligning techniques
- Diagnose and test
- Manufacture gaskets and seals
- Identify hazardous materials
- Identify components
- Recognise worn, damaged or faulty components
- Apply fluid power control principles
- Apply torqueing techniques
- Apply maintenance techniques
- Communicate effectively.

Evidence Guide

EVIDENCE GUIDE

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EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the range statement of the competency standard unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace; however, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be ‘rich’ in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its ‘richness’. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

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Critical aspects of evidence required to demonstrate competency in this unit **9.2)**

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Preparation and planning of work
  - Performance assessment techniques
  - Removal techniques and procedures
  - Overhaul and maintenance techniques and procedures
  - Replacement techniques and procedures
  - Completion of work procedures
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions

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incorporated in the holistic assessment with the above listed items

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and method and in a variety of environments.

Method of assessment

9.4)

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

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Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

UEPMNT402B Conduct complex levelling and alignment

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Hydro turbine types may include Pelton wheel, Francis and Kaplin.

Work site may be affected by nearby plant or processes, e.g. water, noise, oil, confined space and ambient temperatures.

Assembly may entail basic and complex/advanced levelling and aligning procedures.

Components may include white metal bearings, tilting pad bearings, lubrication system components, governor system components, transmissions and couplings.

Test equipment may include optical fibre scope, pressure recorders and vibration monitors.

Work completion details may include plant and maintenance records, job cards, check sheets, on device labelling updates and reporting and/or documenting equipment defects

Isolations can refer to electrical/mechanical or other associated process.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1.00 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

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Competency Field

Competency Field **11)**

Maintenance

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UEPMNT315B Maintain wind turbines

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required for the removal from service and overhaul of wind turbines.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to occupational health and safety.

Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only

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Prerequisite Unit(s) **4)**

after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and prepare for the work	1.1 Work requirements are identified from request/work orders or equivalent and clarified/confirmed with appropriate parties or by site inspection
	1.2 Occupational Health and Safety standards, statutory requirements, relevant Australian standards, codes of practice, manufacturers' specifications, environmental requirements and enterprise procedures are identified, applied and monitored throughout the work procedure
	1.3 Resources required to satisfy the work plan are identified, obtained and inspected for compliance with the job specifications
	1.4 Relevant plans, drawings and texts are selected and interpreted in accordance with the work plan
	1.5 Correct size, type and quantity of materials/components are determined, obtained and inspected for compliance with the job specifications
	1.6 Work is planned in detail including sequencing and prioritising and considerations made, where appropriate, for the maintenance of plant security and capacity in accordance with system/site requirements
	1.7 Coordination requirements, including requests for isolations where appropriate, are resolved with others involved, affected or required by the work
	1.8 Potential hazards are identified and prevention and/or control measures are selected in accordance with the work plan and site procedures
	1.9 Work area is prepared in accordance with work requirements and site procedures
	1.10 Where appropriate, the teams and individuals roles and responsibilities within the team are

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ELEMENT		PERFORMANCE CRITERIA	
			identified and, where required, assist in the provision of the on-the-job training
2	Disassemble turbine	2.1	Required isolations are confirmed where appropriate in accordance with enterprise/site procedures
		2.2	Turbine is disassembled in accordance with manufacturer specifications and work requirements
		2.3	Turbine components are removed in appropriate priority in accordance with manufacturer specifications and work requirements
		2.4	Disassembly is carried out in a manner that will facilitate assembly in accordance with the work plan
		2.5	Components are measured and clearances taken to determine conformity to manufacturer limits, and to ensure assembly is in accordance with manufacturer specifications
		2.6	Measurements and clearances are recorded in accordance with manufacturer specifications and work requirements.
3	Inspect turbine components	3.1	Components are cleaned and inspected in accordance with the work plan
		3.2	Faults are identified and recorded in accordance with the work plan
		3.3	New components are inspected for compliance to manufacturer specifications and work requirements
		3.4	Components are prepared for assembly in accordance with the work plan
4	Repair turbine/ components	4.1	Repairs are carried out in accordance with the work plan.
		4.2	Repairs are tested and results analysed to ensure conformance to specifications and in accordance with the work plan.

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ELEMENT	PERFORMANCE CRITERIA	
	4.3	Data from testing is recorded in accordance with the work plan and enterprise/site procedures
5 Complete the work	5.1	Work is completed and appropriate personnel notified in accordance with site/enterprise requirements
	5.2	Work area is cleared of waste, cleaned, restored and secured in accordance with site/enterprise procedures
	5.3	Plant, tools and equipment are maintained and stored in accordance with site/enterprise procedures
	5.4	Work completion details are finalised in accordance with site/enterprise procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of maintaining wind turbines.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PM315B Wind turbines

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant Environmental, Occupational Health and Safety legislation and regulations
- Relevant plant and equipment, its location
- Technical drawings and manufacturers manuals
- Introduction to and typical arrangements of wind power production plant
- Wind Turbine types and characteristics
- Wind Turbine main components types and characteristics
- Hand and portable power tools
- Precision measuring equipment

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REQUIRED SKILLS AND KNOWLEDGE

- Specialised tools and jigs
- Levelling and aligning techniques
- Diagnostic and testing techniques
- Protective coatings
- Gaskets and seals
- Transmissions/couplings
- Data recording techniques
- Isolation procedures
- Rigging and lifting equipment
- Communication principles

T2 Specific skills needed to achieve the Performance Criteria:

- Apply Relevant Environmental, Occupational Health and Safety legislation and regulations
- Apply levelling and alignment techniques
- Interpret Technical drawings and manufacturers manuals
- Use hand and portable power tools
- Use precision measuring equipment
- Use rigging and lifting equipment
- Use specialised tools and jigs
- Apply levelling and aligning techniques
- Diagnose and test
- Manufacture gaskets and seals
- Recognise worn, damaged or faulty components
- Apply fluid power control principles
- Apply non-destructive testing
- Apply maintenance techniques
- Communicate effectively.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the range statement of the competency standard unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

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Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace; however, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit **9.2)**

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria

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shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Preparation and planning of work
  - Performance assessment techniques
  - Removal techniques and procedures
  - Overhaul and maintenance techniques and procedures
  - Replacement techniques and procedures
  - Completion of work procedures
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items

Context of and specific resources for assessment **9.3)**

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This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and method and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

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UEPMNT402B Conduct complex levelling and alignment

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Wind Turbine components may include rotor, nacelle, high speed shaft, low speed shaft, gearbox, yaw system and tower

Work site may be affected by nearby plant or processes, e.g. water, noise, oil, confined space and ambient temperatures.

Assembly may entail basic and complex/advanced levelling and aligning procedures.

Components may include Rotor, nacelle, high speed shaft, low speed shaft, gearbox, yaw system and tower, lubrication system components, transmissions and couplings.

Test equipment may include optical fibre scope, pressure recorders and vibration monitors.

Work completion details may include plant and maintenance records, job cards, check sheets, on device labelling updates and reporting and/or documenting equipment defects.

Isolations can refer to electrical/mechanical or other associated process.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1.00 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Maintenance

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UEPMNT317B Diagnose and repair faults in mechanical equipment

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to diagnose and repair faults in a range of mechanical equipment and may entail the work to be carried out whilst machinery/plant is on line.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
MEM18006C	Repair and fit engineering components
MEM09002B	Interpret technical drawing
MEM12023A	Perform Engineering Measurements
MEM18001C	Use hand tools
MEM18002B	Use power tools/hand held operations
MEM18003C	Use tools for precision work
MEM18055B	Dismantle, replace and assemble engineering components

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

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Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and prepare for the work	1.1 Work requirements are identified from request/work orders or equivalent and clarified/confirmed with appropriate parties or by site inspection
	1.2 Occupational Health and Safety standards, statutory requirements, relevant Australian standards, codes of practice, manufacturers' specifications, environmental requirements and enterprise procedures are identified, applied and monitored throughout the work procedure
	1.3 Resources required to satisfy the work plan are identified, obtained and inspected for compliance with the job specifications
	1.4 Relevant plans, drawings and texts are selected and interpreted in accordance with the work plan
	1.5 Correct size, type and quantity of materials/components are determined, obtained and inspected for compliance with the job

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ELEMENT	PERFORMANCE CRITERIA	
		specifications
	1.6	Work is planned in detail including sequencing and prioritising and considerations made, where appropriate, for the maintenance of plant security and capacity in accordance with system/site requirements
	1.7	Coordination requirements, including requests for isolations where appropriate, are resolved with others involved, affected or required by the work
	1.8	Potential hazards are identified and prevention and/or control measures are selected in accordance with the work plan and site procedures
	1.9	Work area is prepared in accordance with work requirements and site procedures
	1.10	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2 Verify the fault	2.1	Normal performance and function of the equipment is ascertained by consulting appropriate reference sources in accordance with the work plan
	2.2	Fault indicators and appropriate technical information/diagnostic techniques are used to verify reported symptoms/faults in accordance with the work plan
	2.3	Symptoms are reproduced and monitored if possible, whilst due regard for personnel safety and plant security is observed in accordance with the work plan
3 Find the fault	3.1	Required isolations are confirmed where appropriate in accordance with site requirements
	3.2	Fault finding is carried out in conjunction with others involved in, or affected by, the work in accordance with enterprise/job requirements

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ELEMENT	PERFORMANCE CRITERIA	
	3.3	Equipment components, pipe work, fittings and support fixings are inspected for obvious faults in accordance with the work plan
	3.4	All appropriate fault finding/diagnostic techniques are identified, selected and used to determine the fault in accordance with the work plan
	3.5	Test and measurement instruments are used in accordance with manufacturer instructions and job requirements
4 Determine cause of fault	4.1	All appropriate personnel are consulted in order to obtain as many details relating to the faulty equipment as possible in accordance with the work plan
	4.2	Appropriate use is made of any information from fault indicators and maintenance records in accordance with the work plan
	4.3	Valid conclusions about the nature and cause of the fault are reached from analysis of available evidence in accordance with the work plan
5 Repair or rectify the fault	5.1	Required isolations are confirmed where appropriate in accordance with site requirements
	5.2	Appropriate repair procedures are undertaken in conjunction with others involved in, or affected by, the work in accordance with the work plan
	5.3	Faulty, worn, damaged or unsecured components are replaced, repaired or secured in accordance with the work plan
	5.4	Parts and components are selected and replaced as required in accordance with appropriate specifications and the work plan
	5.5	All faults are repaired or rectified in accordance with the work plan
	5.6	Final job inspection is performed and permits are relinquished as required in accordance with the work plan

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ELEMENT	PERFORMANCE CRITERIA	
6 Complete the work	6.1	Work is completed and appropriate personnel notified in accordance with site/enterprise requirements
	6.2	Work area is cleared of waste, cleaned, restored and secured in accordance with site/enterprise procedures
	6.3	Plant, tools and equipment are maintained and stored in accordance with site/enterprise procedures
	6.4	Work completion details are finalised in accordance with site/enterprise procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of diagnosing and repair faults in mechanical equipment.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PM317B Faults in mechanical equipment

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant Environmental, Occupational Health and Safety legislation and regulations
- Relevant plant and equipment, its location
- Technical drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Equipment and material required to perform the work
- Layout of plant and operation of its equipment
- Performance and function of the equipment
- Fault finding and diagnostic techniques
- Repair techniques

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REQUIRED SKILLS AND KNOWLEDGE

T2 Specific skills needed to achieve the Performance Criteria:

- Apply Relevant Environmental, Occupational Health and Safety legislation and regulations
- Apply levelling and alignment techniques
- Interpret Technical drawings and manufacturers manuals
- Identify equipment and material required to perform the work
- Locate and interpret plans, drawings and texts
- Use tools and relevant equipment
- Use test and measurement instruments
- Verify and identify faults
- Apply fault finding and diagnostic techniques
- Determine cause of faults
- Repair faults
- Communicate effectively.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the range statement of the competency standard unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace; however, it must be in accord

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with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as

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specified in the Performance Criteria and Range Statement
    - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
    - Demonstrate an appropriate level of employability skills
    - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
    - The knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
    - Preparation and planning of work
    - Verification techniques
    - Diagnostic and fault finding techniques and procedures
    - Repairing techniques and procedures
    - Completion of work procedure
    - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces,

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with different types of plant and equipment as well as different structural/construction types and method and in a variety of environments.

Method of assessment

9.4)

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Mechanical equipment may include pumps, valves, hydro turbine, steam turbines, gas turbines, feeders, stainers, fans, fluid power components, burner equipments, heat exchangers and ducting.

Inspection on running plant should be planned with appropriate parties to determine

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RANGE STATEMENT

access and conditions

Work site environment may be affected by nearby plant or processes, e.g. chemical, heat, noise, gas, dust and oil.

Test and measurement instruments may refer to temperature and pressure indicators/recorders, vibration monitors or flow indicators.

Fault indicators may refer to touch, smell, heat, vibration, indication lamps, LED's, alarms and flag relays.

Work completion details may include plant and maintenance records, job cards, check sheets and on-device labelling updates.

Mechanical equipment may be that normally associated with, but not exclusive to, power generation.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1.00 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Maintenance

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UEPMNT318B Conduct generator mechanical maintenance

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to conduct mechanical maintenance of an electrical generating unit.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

Pre-Requisites

Prerequisite Unit(s) **4)**

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Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
MEM18006C	Repair and fit engineering components
MEM09002B	Interpret technical drawing
MEM12023A	Perform Engineering Measurements
MEM18001C	Use hand tools
MEM18002B	Use power tools/hand held operations
MEM18003C	Use tools for precision work
MEM18055B	Dismantle, replace and assemble engineering components

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

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Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and prepare for the work	1.1 Work requirements are identified from request/work orders or equivalent and clarified/confirmed with appropriate parties or by site inspection
	1.2 Occupational Health and Safety standards, statutory requirements, relevant Australian standards, codes of practice, manufacturers' specifications, environmental requirements and enterprise procedures are identified, applied and monitored throughout the work procedure
	1.3 Resources required to satisfy the work plan are identified, obtained and inspected for compliance with the job specifications
	1.4 Relevant plans, drawings and texts are selected and interpreted in accordance with the work plan
	1.5 Correct size, type and quantity of materials/components are determined, obtained and inspected for compliance with the job

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ELEMENT	PERFORMANCE CRITERIA	
		specifications
	1.6	Work is planned in detail including sequencing and prioritising and considerations made, where appropriate, for the maintenance of plant security and capacity in accordance with system/site requirements
	1.7	Coordination requirements, including requests for isolations where appropriate, are resolved with others involved, affected or required by the work
	1.8	Potential hazards are identified and prevention and/or control measures are selected in accordance with the work plan and site procedures
	1.9	Work area is prepared in accordance with work requirements and site procedures
	1.10	Where appropriate the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2 Remove associated equipment	2.1	Required notations are confirmed where appropriate in accordance with site requirements
	2.2	Associated equipment is disconnected in accordance with the work plan
	2.3	Associated equipment is removed in a manner that will assist in replacement in accordance with the work plan
	2.4	Associated equipment is inspected for abnormalities in accordance with the work plan
3 Perform generator maintenance	3.1	Maintenance is performed in accordance with manufacturer specifications and the work plan
	3.2	Generator is dismantled, clearly marked for identification and relevant data/sketches noted/drawn in accordance with the work plan
	3.3	Components are correlated in preparation for re-assembly in accordance with manufacturer

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ELEMENT	PERFORMANCE CRITERIA	
		drawings/manuals
	3.4	New components are inspected to ensure compliance with manufacturer specifications
	3.5	Dimensional inspection is performed on generator and components to ensure compliance with manufacturer specifications.
	3.6	Components are reassembled for any testing required in accordance with manufacturer specifications and the work plan
	3.7	Components are levelled, aligned and coupled in accordance with manufacturer specifications and the work plan
4 Replace generator associated equipment	4.1	Associated equipment is replaced and connected in accordance with the work plan
	4.2	Generator is rotated and checks carried out to ensure operating conditions are in accordance with manufacturer specifications
	4.3	Out of specification modifications/alterations are approved by appropriate authority and recorded and documented in accordance with site/enterprise requirements
	4.4	Final job inspection is completed and any permits relinquished in accordance with the work plan
5 Complete the work	5.1	Work is completed and appropriate personnel notified in accordance with site/enterprise requirements
	5.2	Work area is cleared of waste, cleaned, restored and secured in accordance with site/enterprise procedures
	5.3	Plant, tools and equipment are maintained and stored in accordance with site/enterprise procedures
	5.4	Work completion details are finalised in accordance with site/enterprise procedures

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of conducting generator mechanical maintenance.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PM318B Generator mechanical maintenance

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant Environmental, Occupational Health and Safety legislation and regulations
- Relevant plant and equipment, its location
- Technical drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Construction of electrical Generators
- Hand and portable power tools
- Precision measuring equipment
- Rigging and lifting equipment
- Specialised tools and jigs
- Advanced balancing, levelling and aligning techniques
- Diagnostic and testing techniques
- Gaskets and seals, including complex seals
- Transmissions/couplings
- Valves
- Pipe work
- Isolation procedures
- Communication principles

T2 Specific skills needed to achieve the Performance Criteria:

- Apply Relevant Environmental, Occupational Health and Safety legislation and regulations
- Apply levelling and alignment techniques
- Interpret Technical drawings and manufacturers manuals
- Use hand and portable power tools
- Use precise measuring equipment

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REQUIRED SKILLS AND KNOWLEDGE

- Use rigging and lifting equipment
- Use specialised tools and jigs
- Apply advanced balancing, levelling and aligning techniques
- Apply diagnose and testing techniques
- Manufacture and install gaskets and seals, including complex seals
- Identify hazardous materials
- Identify components
- Recognise worn, damaged or faulty components
- Sequentially assemble and disassemble
- Work to fine tolerances
- Apply data analysis techniques and tools
- Communicate effectively.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the range statement of the competency standard unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace; however, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the

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most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential

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Knowledge and Associated Skills of this unit
- Demonstrate an appropriate level of employability skills
- Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures

- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Preparation and planning of work
  - Performance assessment techniques
  - Removal techniques and procedures
  - Overhaul and maintenance techniques and procedures
  - Replacement techniques and procedures
  - Completion of work procedures
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and method and in a variety of

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environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Maintenance may include refurbishment/replacement of bearings, seals, complex seals, couplings, coolers, pipe work, barring gear, inspection, lubrication and test running.

Generator maintenance may require the removal of the rotor and subsequent replacement would involve complex levelling and alignment techniques.

Precision measuring equipment may include inside/outside micrometers and verniers,

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RANGE STATEMENT

dial gauges, depth gauges, slip gauges and feeler gauges.

Work completion details may include plant and maintenance records, job cards, check sheets and on device labelling updates.

Work site environment may be affected by nearby plant or processes, e.g. heat, noise, dust, oil, water and chemical.

Isolations can refer to electrical/mechanical or other associated processes.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1.00 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Maintenance

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UEPMNT319B Maintain and test fixed fire protection systems

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to conduct maintenance, fault finding and in-service testing of fixed fire protection systems.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

Pre-Requisites

Prerequisite Unit(s) **4)**

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Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
UEENEEG108A	Trouble-shoot and repair faults in low voltage electrical apparatus and circuits
UEENEEE101A	Apply Occupational Health Safety regulations, codes and practices in the workplace
UEENEEE102A	Fabricate, dismantle, assemble of utilities industry components
UEENEEE104A	Solve problems in d.c. circuits
UEENEEE105A	Fix and secure electrotechnology equipment
UEENEEE107A	Use drawings, diagrams, schedules, standards, cords and specifications
UEENEEG006A	Solve problems in single and three phase low voltage machines
UEENEEG033A	Solve problems in single and three phase low voltage electrical apparatus and circuits
UEENEEG063A	Arrange circuits, control and protection for general electrical installations
UEENEEG101A	Solve problems in electromagnetic devices and related circuits
UEENEEG102A	Solve problems in low voltage a.c.

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Prerequisite Unit(s) **4)**

	circuits
UEENEEG106A	Terminate cables, cords and accessories for low voltage circuits

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA

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ELEMENT	PERFORMANCE CRITERIA	
1 Plan and prepare for the work	1.1	Work requirements are identified from request/work orders or equivalent and clarified/confirmed with appropriate parties or by site inspection
	1.2	Occupational Health and Safety standards, statutory requirements, relevant Australian standards, codes of practice, manufacturers' specifications, environmental requirements and enterprise procedures are identified, applied and monitored throughout the work procedure
	1.3	Resources required to satisfy the work plan are identified, obtained and inspected for compliance with the job specifications
	1.4	Relevant plans, drawings and texts are selected and interpreted in accordance with the work plan
	1.5	Correct size, type and quantity of materials/components are determined, obtained and inspected for compliance with the job specifications
	1.6	Work is planned in detail including sequencing and prioritising and considerations made, where appropriate, for the maintenance of plant security and capacity in accordance with system/site requirements
	1.7	Coordination requirements, including requests for isolations where appropriate, are resolved with others involved, affected or required by the work
	1.8	Potential hazards are identified and prevention and/or control measures are selected in accordance with the work plan and site procedures
	1.9	Work area is prepared in accordance with work requirements and site procedures
	1.10	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training

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ELEMENT	PERFORMANCE CRITERIA
2 Maintain fixed fire protection systems	2.1 Dismantling of necessary equipment is done in a manner that will facilitate reassembly in accordance with the work plan
	2.2 Faulty components are repaired/overhauled in accordance with the work plan and the system requirements
	2.3 Replacement items are inspected to confirm compliance with the system specifications
	2.4 Modifications/alterations are undertaken in accordance with the system requirements and the work plan
	2.5 Maintenance is performed in accordance with the work plan and system requirements
3 Conduct in service testing	3.1 In-service testing is carried out in accordance with the system requirements
	3.2 In-service testing is carried out in accordance with relevant statutory requirements
	3.3 Abnormalities, faults and deviations from system specifications are logged and reported to appropriate personnel in accordance with statutory requirements and the work plan
4 Complete the work	4.1 Work is completed and appropriate personnel notified in accordance with site/enterprise requirements
	4.2 Work area is cleared of waste, cleaned, restored and secured in accordance with site/enterprise procedures
	4.3 Plant, tools and equipment are maintained and stored in accordance with site/enterprise procedures
	4.4 Work completion details are finalised in accordance with site/enterprise procedures
	4.5 Work area is prepared in accordance with work requirements and site procedures

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of maintaining and testing fixed fire protection system.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PM319B Fixed fire protection systems

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant Environmental, Occupational Health and Safety legislation and regulations
- Relevant plant and equipment, its location
- Technical drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Measuring equipment
- Quality assurance/quality control
- Data recording techniques
- Hand and portable power tools
- Diagnostic and testing techniques
- Plant and systems
- Communication principles

T2 Specific skills needed to achieve the Performance Criteria:

- Apply Relevant Environmental, Occupational Health and Safety legislation and regulations
- Apply levelling and alignment techniques
- Interpret Technical drawings and manufacturers manuals
- Identify and use measuring equipment
- Use hand and portable power tools
- Use technical drawings and data
- Apply diagnostic and testing techniques
- Dismantle and reassemble components
- Communicate effectively.

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Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the range statement of the competency standard unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace; however, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be ‘rich’ in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its ‘richness’. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

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Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Preparation and planning of work
  - Removal techniques
  - Maintenance techniques and procedures
  - Installation techniques and procedures
  - Completion of work procedures
  - In-service test procedures
  - Dealing with an unplanned event by drawing on essential

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knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and method and in a variety of environments.

Method of assessment

9.4)

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

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Concurrent assessment and relationship with other units **9.5)**

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Details of maintenance may be diagnosis and in-service testing.

Maintenance may include repair, inspection, modification, overhaul, lubrication, servicing and test running.

Work completion details and plans may include plant and maintenance records, job cards, check sheets, on device labelling updates and reporting and/or documenting equipment defects.

Work site environment may be affected by nearby plant or processes, e.g. chemical, heat, dust, noise, gas and oil.

Isolations can refer to electrical/mechanical or other associated processes.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1.00 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

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Competency Field 11)

Maintenance

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UEPMNT320B Inspect and repair/replace faults in mechanical equipment/components

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to inspect and repair faults in a range of mechanical equipment/components which may require fabrication work to be carried out.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
MEM18006C	Repair and fit engineering components
MEM09002B	Interpret technical drawing
MEM12023A	Perform Engineering Measurements
MEM18001C	Use hand tools
MEM18002B	Use power tools/hand held operations
MEM18003C	Use tools for precision work
MEM18055B	Dismantle, replace and assemble engineering components

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

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Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and prepare for the work	1.1 Work requirements are identified from request/work orders or equivalent and clarified/confirmed with appropriate parties or by site inspection
	1.2 Occupational Health and Safety standards, statutory requirements, relevant Australian standards, codes of practice, manufacturers' specifications, environmental requirements and enterprise procedures are identified, applied and monitored throughout the work procedure
	1.3 Resources required to satisfy the work plan are identified, obtained and inspected for compliance with the job specifications
	1.4 Relevant plans, drawings and texts are selected and interpreted in accordance with the work plan
	1.5 Correct size, type and quantity of materials/components are determined, obtained and inspected for compliance with the job

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ELEMENT		PERFORMANCE CRITERIA	
			specifications
		1.6	Work is planned in detail including sequencing and prioritising and considerations made, where appropriate, for the maintenance of plant security and capacity in accordance with system/site requirements
		1.7	Coordination requirements, including requests for isolations where appropriate, are resolved with others involved, affected or required by the work
		1.8	Potential hazards are identified and prevention and/or control measures are selected in accordance with the work plan and site procedures
		1.9	Work area is prepared in accordance with work requirements and site procedures
		1.10	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2	Inspect and dismantle equipment/components	2.1	Equipment/components are dismantled and marked in a manner that will facilitate reassembly
		2.2	Equipment/components are dismantled where required using appropriate engineering principles
		2.3	Damaged or faulty equipment/components are assessed against operational and/or manufacturer specifications
		2.4	Faulty equipment/components identified for repair, replacement or manufacture
3	Repair/replace faulty equipment/components	3.1	Methods of repair are determined in accordance with appropriate engineering procedures
		3.2	Repairs are completed in accordance with appropriate engineering procedures

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ELEMENT		PERFORMANCE CRITERIA	
		3.3	Replacement parts are selected, assessed against specifications, and fitted using appropriate engineering procedures.
4	Manufacture parts or components	4.1	Parts/components specifications are determined using appropriate engineering methods
		4.2	Appropriate materials are selected in accordance with the work requirements
		4.3	Parts/components are manufactured/ fabricated using appropriate engineering methods
		4.4	Completed work is inspected to ensure compliance with the work requirements and specifications
5	Reassemble equipment/components	5.1	Equipment/components are reassembled in accordance with the work plan
		5.2	Final assembly is inspected to ensure compliance with operational and/or manufacturer specifications
6	Complete the work	6.1	Work is completed and appropriate personnel notified in accordance with site/enterprise requirements
		6.2	Work area is cleared of waste, cleaned, restored and secured in accordance with site/enterprise procedures
		6.3	Plant, tools and equipment are maintained and stored in accordance with site/enterprise procedures
		6.4	Work completion details are finalised in accordance with site/enterprise procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this

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REQUIRED SKILLS AND KNOWLEDGE

unit.

Evidence shall show that knowledge has been acquired of inspecting and repairing/replacing faults in mechanical equipment/components.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PM320B Faults in mechanical equipment/components

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant Environmental, Occupational Health and Safety legislation and regulations
- Relevant plant and equipment, its location
- Technical drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Equipment and material required to perform the work
- Repair techniques

T2 Specific skills needed to achieve the Performance Criteria:

- Apply Relevant Environmental, Occupational Health and Safety legislation and regulations
- Apply levelling and alignment techniques
- Interpret Technical drawings and manufacturers manuals
- Identify equipment and material required to perform the work
- Locate and interpret plans, drawings and texts
- Carry out work in a logical manner
- Use tools and relevant equipment
- Identify faults
- Repair faults
- Communicate effectively.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the range statement of the competency standard unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with

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EVIDENCE GUIDE

the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace; however, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be ‘rich’ in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its ‘richness’. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in **9.2)**

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this unit

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Preparation and planning of work
  - Inspection procedures
  - Dismantling and reassembly techniques and procedures
  - Repairing techniques and procedures and completion of work procedures
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items

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Context of and specific resources for assessment **9.3)**

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and method and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

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There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Mechanical equipment may include, pumps, valves, hydro turbine, steam turbines, gas turbines, feeders, stainers, fans, fluid power components, burner equipments, heat exchangers and ducting.

Inspection on running plant should be planned with appropriate parties to determine access and conditions.

Work site environment may be affected by nearby plant or processes, e.g. chemical, heat, noise, gas, dust and oil.

Work completion details may include plant and maintenance records, job cards, check sheets and on-device labelling updates.

Mechanical equipment may be that normally associated with, but not exclusive to, power generation.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1.00 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Maintenance

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UEPMNT339B Perform sheet metal work

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to undertake marking out and development, fabrication and installation of sheet metal work.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

Pre-Requisites

Prerequisite Unit(s) **4)**

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Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
MEM18006C	Repair and fit engineering components
MEM09002B	Interpret technical drawing
MEM12023A	Perform Engineering Measurements
MEM18001C	Use hand tools
MEM18002B	Use power tools/hand held operations
MEM18003C	Use tools for precision work
MEM18055B	Dismantle, replace and assemble engineering components

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

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Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and prepare for the work	1.1 Work requirements are identified from request/work orders or equivalent and clarified/confirmed with appropriate parties or by site inspection
	1.2 Occupational Health and Safety standards, statutory requirements, relevant Australian standards, codes of practice, manufacturers' specifications, environmental requirements and enterprise procedures are identified, applied and monitored throughout the work procedure
	1.3 Resources required to satisfy the work plan are identified, obtained and inspected for compliance with the job specifications
	1.4 Relevant plans, drawings and texts are selected and interpreted in accordance with the work plan
	1.5 Correct size, type and quantity of materials/components are determined, obtained and inspected for compliance with the job

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ELEMENT		PERFORMANCE CRITERIA	
			specifications
		1.6	Work is planned in detail including sequencing and prioritising and considerations made, where appropriate, for the maintenance of plant security and capacity in accordance with system/site requirements
		1.7	Coordination requirements, including requests for isolations where appropriate, are resolved with others involved, affected or required by the work
		1.8	Potential hazards are identified and prevention and/or control measures are selected in accordance with the work plan and site procedures
		1.9	Work area is prepared in accordance with work requirements and site procedures
		1.10	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2	Mark out and develop sheet metal work	2.1	Appropriate development method and material is chosen and applied in accordance with the work plan
		2.2	Datum points are established to ensure efficient use of materials in accordance with the work plan
		2.3	Marking out/development is performed within established tolerances and in accordance with the work plan
		2.4	Marking out and development is checked to ensure compliance with specifications and the work plan
3	Fabricate sheet metal work	3.1	Sheet metal work is fabricated in accordance with the work plan and specifications
		3.2	Materials and templates, where appropriate, are cut and formed using appropriate machinery or

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ELEMENT	PERFORMANCE CRITERIA	
		tools in accordance with the work plan
	3.3	Machinery and tools are used in accordance with manufacturer specification and the work plan
	3.4	Fabricated work is checked to ensure compliance with specifications and the work plan
4 Install sheet metal work	4.1	Required isolations are confirmed where appropriate in accordance with work requirements
	4.2	Installation of sheet metal work is performed in accordance with the work plan
	4.3	Repairs/modifications are carried out where necessary in accordance with the work plan
	4.4	Machinery and tools are used in accordance with manufacturer specifications and the work plan
	4.5	Installed work is checked to ensure compliance with specifications and the work plan
5 Complete the work	5.1	Work is completed and appropriate personnel notified in accordance with site/enterprise requirements
	5.2	Work area is cleared of waste, cleaned, restored and secured in accordance with site/enterprise procedures
	5.3	Plant, tools, equipment and materials are maintained and stored in accordance with site/enterprise procedures
	5.4	Work completion and documentation details are finalised in accordance with site/enterprise procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this

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REQUIRED SKILLS AND KNOWLEDGE

unit.

Evidence shall show that knowledge has been acquired performing sheet metal work.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PM339B Sheet metal work

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant Environmental, Occupational Health and Safety legislation and regulations
- Relevant plant and equipment, its location
- Technical drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Hazardous materials and their handling
- Marking off/out and development methods
- Hand and portable power tools
- Basic metallurgy
- Sheet metal working machinery
- Fabrication techniques
- Soldering and welding
- Geometric concepts
- Engineering principles
- Installation techniques

T2 Specific skills needed to achieve the Performance Criteria:

- Apply Relevant Environmental, Occupational Health and Safety legislation and regulations
- Interpret Technical drawings and manufacturers manuals
- Apply hazardous materials handling procedures
- Mark out/off and develop
- Apply measurements
- Use hand and portable power tools
- Select and use appropriate machinery
- Apply fabrication development and techniques and procedures
- Apply installation techniques and procedures
- Apply environmental procedures
- Select materials
- Use specialist tools
- Modify/repair sheet metal work
- Communicate effectively.

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Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the range statement of the competency standard unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace; however, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be ‘rich’ in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its ‘richness’. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment

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instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Preparation and planning of work
  - Layout, marking off/out and developing techniques and procedures
  - Fabrication techniques

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- Installation techniques and procedures
- Relevant standards and procedures
- Completion of work procedures
- Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment **9.3)**

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and method and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment

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and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Insulation material may include asbestos, calcium silicate, rockwool, insulfrax and fibre glass.

Sheet metal work may include, to a range of up to 3mm, fabrication of cladding, protective covers, cabinets, boxes and ducting.

Developments may include hoppers, chutes, conical and spherical shapes and spirals.

Fabrication methods may include cutting, bending, rolling, beading, soldering and welding.

Control measures for insulation materials may be disposable overalls, dust mask, eye protection, gloves and, if required, the engagement of specialised asbestos removal/handling resources.

Sheet metal material may include mild steel, galvanised or stainless steel, aluminium and brass.

Work completion details may include plant and maintenance records, job cards, check sheets, on device labelling updates and reporting and/or documenting equipment defects.

Work site environment may be affected by nearby plant or processes, e.g. chemical, heat, dust, noise, gas and oil.

Isolations can refer to electrical/mechanical or other associated processes.

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RANGE STATEMENT

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1.00 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Maintenance

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UEPMNT340B Fabricate metal structures and components

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to fabricate metal structures and components required to facilitate the installation, modification and maintenance of equipment associated with the Generation industry sector.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
MEM18006C	Repair and fit engineering components
MEM09002B	Interpret technical drawing
MEM12023A	Perform Engineering Measurements
MEM18001C	Use hand tools
MEM18002B	Use power tools/hand held operations
MEM18003C	Use tools for precision work
MEM18055B	Dismantle, replace and assemble engineering components

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Reading, Writing and Numeracy.

Reading 3 Writing 3 Numeracy 3

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Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and prepare for the work	1.1 Work requirements are identified from request/work orders or equivalent and clarified/confirmed with appropriate parties or by site inspection
	1.2 Occupational Health and Safety standards, statutory requirements, relevant Australian standards, codes of practice, manufacturers' specifications, environmental requirements and enterprise procedures are identified, applied and monitored throughout the work procedure
	1.3 Resources required to satisfy the work plan are identified, obtained and inspected for compliance with the job specifications
	1.4 Relevant plans, drawings and texts are selected and interpreted in accordance with the work plan
	1.5 Correct size, type and quantity of materials/components are determined, obtained and inspected for compliance with the job

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ELEMENT	PERFORMANCE CRITERIA	
		specifications
	1.6	Work is planned in detail including sequencing and prioritising and considerations made, where appropriate, for the maintenance of plant security and capacity in accordance with system/site requirements
	1.7	Coordination requirements, including requests for isolations where appropriate, are resolved with others involved, affected or required by the work
	1.8	Potential hazards are identified and prevention and/or control measures are selected in accordance with the work plan and site procedures
	1.9	Work area is prepared in accordance with work requirements and site procedures
	1.10	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2 Fabricate structures and components	2.1	Materials are prepared prior to fabrication in accordance with job plan or enterprise requirements
	2.2	Jigs or templates are manufactured as required in accordance with the job plan
	2.3	Materials are marked out/off and dimensions checked in accordance with the job plan and enterprise standards
	2.4	Materials are cut and formed using appropriate machinery and tools in accordance with the job plan
	2.5	Tools and equipment are operated during fabrication tasks in accordance with manufacturer specifications and enterprise standards
	2.6	Structures and components are assembled using appropriate methods in accordance with the job

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ELEMENT	PERFORMANCE CRITERIA	
		plan and specifications
	2.7	Distortion is prevented or controlled applying appropriate techniques in accordance with job requirements
	2.8	Final job inspection is performed and permits are relinquished as required in accordance with the work plan
3 Complete the work	3.1	Work is completed and appropriate personnel notified in accordance with site/enterprise requirements
	3.2	Work area is cleared of waste, cleaned, restored and secured in accordance with site/enterprise procedures
	3.3	Plant, tools and equipment are maintained and stored in accordance with site/enterprise procedures
	3.4	Work completion details are finalised in accordance with site/enterprise procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired fabricate metal structures and components.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PM340B Metal structures and components

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant Environmental, Occupational Health and Safety legislation and regulations
- Relevant plant and equipment, its location

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REQUIRED SKILLS AND KNOWLEDGE

- Technical drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Basic metallurgy
- Hand and portable power tools
- Welding, heating and cutting techniques
- Mechanical cutting techniques
- Paints, sealants and glues
- Sheet metal work
- Distortion control techniques
- Jigs and templates
- Levelling and aligning techniques
- Workshop plant and equipment
- Assembly techniques
- Fabrication techniques and principles
- Geometric development techniques
- Materials/sections
- Forming and shaping techniques and principles
- Heating, cutting and welding equipment
- Mathematical techniques

T2 Specific skills needed to achieve the Performance Criteria:

- Apply Relevant Environmental, Occupational Health and Safety legislation and regulations
- Interpret Technical drawings and manufacturers manuals
- Use welding, cutting and heating equipment
- Use workshop plant and equipment
- Apply geometric development concepts
- Apply basic engineering concepts
- Apply basic engineering design concepts
- Perform precision measurements
- Use hand and portable power tools
- Fabricate, assemble and install structures and components
- Select materials and resources
- Apply distortion control techniques
- Apply job inspection techniques
- Make jigs and templates
- Apply levelling and aligning techniques
- Apply metal forming techniques
- Communicate effectively

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Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the range statement of the competency standard unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace, however, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be ‘rich’ in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its ‘richness’. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

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Critical aspects of evidence required to demonstrate competency in this unit **9.2)**

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Preparation and planning of work
  - Lay out, marking off/out and developing techniques and procedures
  - Geometric development principles and techniques
  - Fabrication and assembly of metal structures and components
  - Heating, thermal cutting, gouging, shaping and welding

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techniques

- Relevant standards and procedures
- Completion of work procedures
- Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and method and in a variety of environments.

Method of assessment

9.4)

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment

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and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Resources may include personnel, lifting equipment, transport and consumables.

Plant and equipment may include rollers, press, metal punch, cropper, guillotine, measuring and hand tools; forming and shaping equipment, welding equipment, cutting equipment, hydraulic equipment and lifting equipment.

Materials may include mild steel, stainless steel, brass, aluminium, high carbon steel, copper, cast iron, high and low alloy steel, tungsten carbide, white metal and stellite.

Forming may include bending, pressing, rolling. flaring of boiler tubes, heat treatment, forging, dogging, wedging, cutting and grinding.

Assembly method may include riveting, bolting, tack welding, clamping, soldering, brazing and lock joints.

Distortion control/prevention techniques may include bracing, heat treatment and pre-setting.

Fabrication may include sheet and plate, structural and pipe.

Maintenance may include servicing and minor mechanical maintenance.

Work completion details may include plant and maintenance records, job cards, check sheets and on device labelling updates.

Work site environment may be affected by nearby plant or processes, e.g. heat, noise, dust, oil, water and chemical.

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RANGE STATEMENT

Isolations can refer to electrical/mechanical or other associated processes.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1.00 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Maintenance

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UEPMNT345B Install electronic equipment

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to undertake the installation of electronic equipment containing solid state components, complex control panels and complex control equipment.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit may require an electrical licence to practise in the workplace.

Practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
UEENEEE101A	Apply Occupational Health Safety regulations, codes and practices in the workplace
UEENEEE102A	Fabricate, dismantle, assemble of utilities industry components
UEENEEE104A	Solve problems in d.c. circuits
UEENEEE105A	Fix and secure electrotechnology equipment
UEENEEE107A	Use drawings, diagrams, schedules, standards, cords and specifications
UEENEEE137A	Document and apply measures to control OHS risks associated with electrotechnology work
UEENEEG006A	Solve problems in single and three phase low voltage machines
UEENEEG033A	Solve problems in single and three phase low voltage electrical apparatus and circuits
UEENEEG063A	Arrange circuits, control and protection for general electrical installations
UEENEEG101A	Solve problems in electromagnetic devices and related circuits

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Prerequisite Unit(s) **4)**

UEENEEG102A	Solve problems in low voltage a.c. circuits
UEENEEG106A	Terminate cables, cords and accessories for low voltage circuits
UEENEEG108A	Trouble-shoot and repair faults in low voltage electrical apparatus and circuits
UEENEEG109A	Develop and connect electrical control circuits

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the

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Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and prepare for the work	1.1 Work requirements are identified from request/work orders or equivalent and clarified/confirmed with appropriate parties or by site inspection
	1.2 Occupational Health and Safety standards, statutory requirements, relevant Australian standards, codes of practice, manufacturers' specifications, environmental requirements and enterprise procedures are identified, applied and monitored throughout the work procedure
	1.3 Resources required to satisfy the work plan are identified, obtained and inspected for compliance with the job specifications
	1.4 Relevant plans, drawings and texts are selected and interpreted in accordance with the work plan
	1.5 Correct size, type and quantity of materials/components are determined, obtained and inspected for compliance with the job specifications
	1.6 Work is planned in detail including sequencing and prioritising and considerations made, where appropriate, for the maintenance of plant security and capacity in accordance with system/site requirements
	1.7 Coordination requirements, including requests for isolations where appropriate, are resolved with others involved, affected or required by the work
	1.8 Potential hazards are identified and prevention and/or control measures are selected in accordance with the work plan and site procedures

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ELEMENT	PERFORMANCE CRITERIA	
	1.9	Work area is prepared in accordance with work requirements and site procedures
	1.10	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2 Install the equipment	2.1	Required isolations are confirmed where appropriate in accordance with site requirements
	2.2	Equipment is assembled, positioned and secured in accordance with appropriate plans, drawings and texts
	2.3	Equipment is installed in conjunction with others involved in, or affected by, the work in accordance with the work plan
	2.4	Cables, wires are identified and appropriately labelled/colour coded in accordance with the work plan
	2.5	Cables, wires are secured, glanded and terminated to appropriate specifications in accordance with the work plan
	2.6	Final job inspection is carried out and permits relinquished in accordance with the work plan
3 Complete the work	3.1	Work is completed and appropriate personnel notified in accordance with site/enterprise requirements
	3.2	Work area is cleared of waste, cleaned, restored and secured in accordance with site/enterprise procedures
	3.3	Plant, tools and equipment are maintained and stored in accordance with site/enterprise procedures
	3.4	Work completion details are finalised in accordance with site/enterprise procedures

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of installing electronic equipment.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PM345B Electronic electrical equipment

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant Environmental, Occupational Health and Safety legislation and regulations
- Relevant plant and equipment, its location
- Technical drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Relevant state and territory regulations
- Relevant Australian standards
- Equipment and material required to perform the work
- Isolation procedures
- Installation requirements of the equipment
- Electronic equipment
- Level and align
- Electronic fundamentals
- Test and measurement instruments
- Engineering and electronic workshop practice

T2 Specific skills needed to achieve the Performance Criteria:

- Apply Relevant Environmental, Occupational Health and Safety legislation and regulations
- Interpret Technical drawings and manufacturers manuals
- Apply relevant state and territory regulations
- Apply relevant Australian standards
- Levelling and aligning procedures
- Use tools and relevant equipment
- Use test and measurement instruments
- Use correct termination procedures
- Use correct installation procedures for the equipment
- Identify and select materials for the job

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REQUIRED SKILLS AND KNOWLEDGE

- Apply regulatory procedures
- Communicate effectively
- Apply engineering and electronic workshop practices

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the range statement of the competency standard unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace, however, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be ‘rich’ in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing

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on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures;

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Enterprise/site emergency procedures

- Preparation and planning of work
- Installation techniques and procedures
- Completion of work procedures
- Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and method and in a variety of environments.

Method of assessment

9.4)

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended

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for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Inspection should be planned with the appropriate parties to determine access, conditions and work requirements.

Equipment may refer to PLC's, I/O modules, VDU's, DCS equipment alarms, stabilised power units and uninterrupted power supply units.

Materials may refer to insulation tapes, heat shrink, sleeving, spiral binding, cable ties, solder, lubricants, oil, greases, sealants, lugs, connectors, terminal blocks, cable markers and identification labels.

Components may include fuses/circuit breakers, timers, coils, relays, resistors, inductors, capacitors, bridge rectifiers, diodes, heat sinks, solenoids, overloads, plug in printed circuit boards, switches, plugs, cable and thermistors.

Test and measurement instruments may refer to insulation resistance/continuity tester and multimeters.

Work completion details may include, plant and maintenance records, job cards, check sheets and on device labelling updates.

Work site environment may be affected by nearby plant or processes, e.g. heat, noise, dust, oil, water and chemical.

Isolations can refer to electrical/mechanical or other associated processes.

Generic terms are used throughout this Training Package for vocational standard shall

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RANGE STATEMENT

be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1.00 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Maintenance

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UEPMNT346B Maintain electrical equipment

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to undertake the maintenance of electrical equipment including, but not limited to, rotating and static machines, appliances, luminaries and associated control equipment, but excludes H.V. equipment.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit may require an electrical licence to practise in the workplace.

Practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
UEENEEG108A	Trouble-shoot and repair faults in low voltage electrical apparatus and circuits
UEENEEE101A	Apply Occupational Health Safety regulations, codes and practices in the workplace
UEENEEE102A	Fabricate, dismantle, assemble of utilities industry components
UEENEEE105A	Fix and secure electrotechnology equipment
UEENEEE107A	Use drawings, diagrams, schedules, standards, cords and specifications
UEENEEG006A	Solve problems in single and three phase low voltage machines
UEENEEG033A	Solve problems in single and three phase low voltage electrical apparatus and circuits
UEENEEG063A	Arrange circuits, control and protection for general electrical installations
UEENEEG101A	Solve problems in electromagnetic devices and related circuits
UEENEEG102A	Solve problems in low voltage a.c. circuits

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Prerequisite Unit(s) **4)**

UEENEEG106A	Terminate cables, cords and accessories for low voltage circuits

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and prepare for	1.1 Work requirements are identified from request/work orders or equivalent and

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ELEMENT	PERFORMANCE CRITERIA	
the work		clarified/confirmed with appropriate parties or by site inspection
	1.2	Occupational Health and Safety standards, statutory requirements, relevant Australian standards, codes of practice, manufacturers' specifications, environmental requirements and enterprise procedures are identified, applied and monitored throughout the work procedure
	1.3	Resources required to satisfy the work plan are identified, obtained and inspected for compliance with the job specifications
	1.4	Relevant plans, drawings and texts are selected and interpreted in accordance with the work plan
	1.5	Correct size, type and quantity of materials/components are determined, obtained and inspected for compliance with the job specifications
	1.6	Work is planned in detail including sequencing and prioritising and considerations made, where appropriate, for the maintenance of plant security and capacity in accordance with system/site requirements
	1.7	Coordination requirements, including requests for isolations where appropriate, are resolved with others involved, affected or required by the work
	1.8	Potential hazards are identified and prevention and/or control measures are selected in accordance with the work plan and site procedures
	1.9	Work area is prepared in accordance with work requirements and site procedures
	1.10	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2 Carry out	2.1	Required isolations are confirmed where

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ELEMENT	PERFORMANCE CRITERIA	
maintenance		appropriate in accordance with site requirements
	2.2	Equipment is maintained using appropriate plans, drawings and texts in accordance with the work plan
	2.3	Equipment is maintained in conjunction with others involved in, or affected by, the work in accordance with the work plan
	2.4	Reset and/or adjustments required are carried out to ensure equipment operates within requirements in accordance with the work plan
	2.5	Maintenance and resets/adjustments are carried out, mindful of effects on, or unnecessary loss of, other equipment
	2.6	Final job inspection is carried out and permits relinquished in accordance with the work plan
3 Complete the work	3.1	Work is completed and appropriate personnel notified in accordance with site/enterprise requirements
	3.2	Work area is cleared of waste, cleaned, restored and secured in accordance with site/enterprise procedures
	3.3	Plant, tools and equipment are maintained and stored in accordance with site/enterprise procedures
	3.4	Work completion details are finalised in accordance with site/enterprise procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired in maintaining electrical equipment.

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REQUIRED SKILLS AND KNOWLEDGE

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PM346B Electrical equipment

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant Environmental, Occupational Health and Safety legislation and regulations
- Relevant plant and equipment, its location
- Technical drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Relevant state and territory regulations
- Relevant Australian standards
- Equipment and material required to perform the work
- Isolation procedures
- Maintenance techniques for the equipment
- Electrical equipment
- Electrical principles
- Test and measurement instruments
- Electrical installation practice
- Engineering and workshop practice

T2 Specific skills needed to achieve the Performance Criteria:

- Apply Relevant Environmental, Occupational Health and Safety legislation and regulations
- Interpret Technical drawings and manufacturers manuals
- Apply relevant state and territory regulations
- Apply relevant Australian standards
- Use tools and equipment
- Use test and measurement instruments
- Use maintenance procedures
- Identify and select materials
- Carry out work completion details
- Apply electrical principles

Evidence Guide

EVIDENCE GUIDE

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EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the range statement of the competency standard unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace, however, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be ‘rich’ in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its ‘richness’. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

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Critical aspects of evidence required to demonstrate competency in this unit **9.2)**

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Preparation and planning of work
  - Installation techniques and procedures
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

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Context of and specific resources for assessment **9.3)**

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and method and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

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There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Inspection should be planned with the appropriate parties to determine access, conditions and work requirements.

Equipment may include a.c. motors, alternators, d.c. motors, generators, pumps, electro/mechanical motor starters, low voltage transformers/switchgear and associated control panels, motor operated valves, hoists and cranes, arc welders, resistive heaters, hot water units, exhaust fans, luminaries, batteries, metal detectors, general low voltage lighting, power circuits, control/indication and alarm circuits, electrical tools/appliances, workshop machinery and compressors.

Materials may include masonry anchors, bolts, nuts, washers, screws, rivets, saddles, clips, brackets, solvents, adhesives, insulation tapes, heat shrink, sleeving, spiral binding, cable ties, solder, lubricants, oils, greases, sealants, lugs, connectors, terminal blocks, cable markers and identification labels.

Components may include fuses/circuit breakers, earth leakage breakers, timers, contactors, contacts, coils, relays, resistors, ballasts, capacitors, solenoids, overloads, switches, plugs, busbar, cable, fans, thermostats, elements, seals, motor bearings and brushgear.

Test and measurement instruments may include tong testers, insulation resistance/continuity tester, multimeters, ductor tester, overload injection tester and growlers.

Work may be performed with equipment on line.

Work completion details may include plant and maintenance records, job cards, check sheets and on device labelling updates.

Work site environment may be affected by nearby plant or processes, e.g. heat, noise, dust, oil, water and chemical.

Isolations can refer to electrical/mechanical or other associated processes.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The

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RANGE STATEMENT

definition of these and other terms are given in Section 2.1.00 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Maintenance

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UEPMNT347B Maintain complex electrical equipment

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit refers to the maintenance of complex and H.V. electrical equipment.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit may require an electrical licence to practise in the workplace.

Practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

Pre-Requisites

Prerequisite Unit(s) **4)**

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Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
UEPMNT346B	Maintain electrical equipment

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading	3	Writing	3	Numeracy	3

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a

Performance Criteria describe the required performance needed to demonstrate achievement of the element.

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competency standard unit	Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Plan and prepare for the work	1.1	Work requirements are identified from request/work orders or equivalent and clarified/confirmed with appropriate parties or by site inspection
	1.2	Occupational Health and Safety standards, statutory requirements, relevant Australian standards, codes of practice, manufacturers' specifications, environmental requirements and enterprise procedures are identified, applied and monitored throughout the work procedure
	1.3	Resources required to satisfy the work plan are identified, obtained and inspected for compliance with the job specifications
	1.4	Relevant plans, drawings and texts are selected and interpreted in accordance with the work plan
	1.5	Correct size, type and quantity of materials/components are determined, obtained and inspected for compliance with the job specification
	1.6	Work is planned in detail including sequencing and prioritising and considerations made, where appropriate, for the maintenance of plant security and capacity in accordance with system/site requirements
	1.7	Coordination requirements, including requests for isolations where appropriate, are resolved with others involved, affected or required by the work
	1.8	Potential hazards are identified and prevention and/or control measures are selected in accordance with the work plan and site procedures

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ELEMENT		PERFORMANCE CRITERIA	
		1.9	Work area is prepared in accordance with work requirements and site procedures
		1.10	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2	Carry out maintenance	2.1	Required isolations are confirmed where appropriate in accordance with site requirements
		2.2	Equipment is maintained using appropriate plans, drawings and texts in accordance with the work plan
		2.3	Equipment is maintained in conjunction with others involved in, or affected by, the work in accordance with the work plan
		2.4	Resets and/or adjustments required are carried out to ensure equipment operates within requirements in accordance with the work plan
		2.5	Maintenance and resets/adjustments are carried out, mindful of effects on, or unnecessary loss of, other equipment
		2.6	Final job inspection is carried out and permits relinquished in accordance with the work plan.
3	Complete the work	3.1	Work is completed and appropriate personnel notified in accordance with site/enterprise requirements
		3.2	Work area is cleared of waste, cleaned, restored and secured in accordance with site/enterprise procedures
		3.3	Plant, tools and equipment are maintained and stored in accordance with site/enterprise procedures
		3.4	Work completion details are finalised in accordance with site/enterprise procedures

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of maintaining complex electrical equipment.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PM347B Complex electrical equipment

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant Environmental, Occupational Health and Safety legislation and regulations
- Relevant plant and equipment, its location
- Technical drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Relevant state and territory regulations
- Relevant Australian standards
- Equipment and material required to perform the work
- Isolation procedures
- Maintenance techniques for the equipment
- Complex electrical equipment
- Electrical principles
- Test and measurement instruments
- Electrical installation practice
- Circuit plan appreciation
- Engineering and electronic workshop practice

T2 Specific skills needed to achieve the Performance Criteria:

- Apply Relevant Environmental, Occupational Health and Safety legislation and regulations
- Interpret Technical drawings and manufacturers manuals
- Apply relevant state and territory regulations
- Apply relevant Australian standards
- Use tools and equipment
- Use test and measurement instruments
- Use maintenance procedures
- Identify and select materials
- Apply regulatory procedures

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REQUIRED SKILLS AND KNOWLEDGE

- Carry out work completion details
- Apply electrical principles
- Communicate effectively
- Apply engineering and electronic workshop practices.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the range statement of the competency standard unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace, however, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be ‘rich’ in nature so as to minimise error in judgment.

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Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement OH&S workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The knowledge and application of relevant sections of: OH&S legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures

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- Installation techniques and procedures
- Completion of work procedures
- Preparation and planning of work
- Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and method and in a variety of environments.

Method of assessment

9.4)

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment

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and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Inspection should be planned with the appropriate parties to determine access, conditions and work requirements.

Equipment may include HV transformers, tap changers, HV switchgear and associated control panels, alarms, alternators, unit control panels, mimic panels, automatic voltage regulators, sootblowers, battery chargers, precipitators and overhead cranes.

Materials may include masonry anchors, bolts, nuts, washers, screws, rivets, saddles, clips, brackets, solvents, adhesives, insulation tapes, heat shrink, sleeving, spiral binding, cable ties, solder, lubricants, oil, greases, sealants, lugs, connectors, terminal blocks, cable markers, identification labels, transformer oil, jointing compound, cable compounds and phase markers.

Components may include fuses/circuit breakers, timers, contactors, contacts, coils, relays, solenoids, overloads, switches, plugs, busbar, cable, fans, thermostats, elements, seals and motor bearings and brush gear.

Test and measurement instruments may include multimeters, tong testers, insulation resistance/continuity tester, ductor tester, growlers, overload injection tester, liquid leak tester, pressure gauges, vacuum gauges, dew point test equipment, insulating oil tester and specialist test equipment.

Maintenance may include sampling, testing, treating and disposal of insulation mediums.

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RANGE STATEMENT

Work may be performed with equipment on line.

Work completion details may include plant and maintenance records, job cards, check sheets and on device labelling updates.

Work site environment may be affected by nearby plant or process, e.g. heat, noise, dust, oil, water and chemical.

Isolations can refer to electrical/mechanical or other associated processes.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1.00 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Maintenance

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UEPMNT348B Maintain electrical electronic equipment

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to undertake the maintenance of electronic electrical equipment containing solid state components, complex control panels and complex control equipment.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit may require an electrical licence to practise in the workplace.

Practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
UEENEEG108A	Trouble-shoot and repair faults in low voltage electrical apparatus and circuits
UEENEEE101A	Apply Occupational Health Safety regulations, codes and practices in the workplace
UEENEEE107A	Use drawings, diagrams, schedules, standards, cords and specifications
UEENEEG006A	Solve problems in single and three phase low voltage machines
UEENEEG033A	Solve problems in single and three phase low voltage electrical apparatus and circuits
UEENEEG063A	Arrange circuits, control and protection for general electrical installations
UEENEEG101A	Solve problems in electromagnetic devices and related circuits
UEENEEG102A	Solve problems in low voltage a.c. circuits
UEENEEG106A	Terminate cables, cords and accessories for low voltage circuits

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Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and prepare for the work	1.1 Work requirements are identified from request/work orders or equivalent and clarified/confirmed with appropriate parties or by site inspection
	1.2 Occupational Health and Safety standards, statutory requirements, relevant Australian standards, codes of practice, manufacturers’

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ELEMENT	PERFORMANCE CRITERIA	
		specifications, environmental requirements and enterprise procedures are identified, applied and monitored throughout the work procedure
	1.3	Resources required to satisfy the work plan are identified, obtained and inspected for compliance with the job specifications
	1.4	Relevant plans, drawings and texts are selected and interpreted in accordance with the work plan
	1.5	Correct size, type and quantity of materials/components are determined, obtained and inspected for compliance with the job specifications
	1.6	Work is planned in detail including sequencing and prioritising and considerations made, where appropriate, for the maintenance of plant security and capacity in accordance with system/site requirements
	1.7	Coordination requirements, including requests for isolations where appropriate, are resolved with others involved, affected or required by the work
	1.8	Potential hazards are identified and prevention and/or control measures are selected in accordance with the work plan and site procedures
	1.9	Work area is prepared in accordance with work requirements and site procedures
	1.10	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2 Carry out maintenance	2.1	Required isolations are confirmed where appropriate in accordance with site requirements
	2.2	Equipment is maintained using appropriate plans, drawings and texts in accordance with the work plan

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ELEMENT	PERFORMANCE CRITERIA	
	2.3	Equipment is maintained in conjunction with others involved in, or affected by, the work in accordance with the work plan
	2.4	Resets and/or adjustments required are carried out to ensure equipment operates within requirements in accordance with the work plan
	2.5	Maintenance and resets/adjustments are carried out, mindful of effects on, or unnecessary loss of, other equipment
	2.6	Final job inspection is carried out and permits relinquished in accordance with the work plan.
3 Complete the work	3.1	Work is completed and appropriate personnel notified in accordance with site/enterprise requirements
	3.2	Work area is cleared of waste, cleaned, restored and secured in accordance with site/enterprise procedures
	3.3	Plant, tools and equipment are maintained and stored in accordance with site/enterprise procedures
	3.4	Work completion details are finalised in accordance with site/enterprise procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of maintaining electrical electronic equipment.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PM348B Electrical electronic equipment

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REQUIRED SKILLS AND KNOWLEDGE

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant Environmental, Occupational Health and Safety legislation and regulations
- Relevant plant and equipment, its location
- Technical drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Relevant state and territory regulations
- Relevant Australian standards
- Equipment and material required to perform the work
- Layout of plant/work site and operation of its equipment
- Maintenance techniques for the equipment
- Electronic principles
- Electronic electrical equipment
- Regulatory requirements
- Electrical principles
- Test and measurement instruments
- Electrical installation practice
- Engineering and electronic workshop practice

T2 Specific skills needed to achieve the Performance Criteria:

- Apply Relevant Environmental, Occupational Health and Safety legislation and regulations
- Interpret Technical drawings and manufacturers manuals
- Apply relevant state and territory regulations
- Apply relevant Australian standards
- Use tools and equipment
- Use test and measurement instruments
- Use maintenance procedures
- Identify and select materials
- Apply regulatory procedures
- Carry out work completion details
- Apply electrical principles
- Communicate effectively
- Apply data analysis techniques and tools
- Apply engineering and electronic workshop practices.

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Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the range statement of the competency standard unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace, however, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be ‘rich’ in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its ‘richness’. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

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Critical aspects of evidence required to demonstrate competency in this unit **9.2)**

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Preparation and planning of work
  - Installation techniques and procedures
  - Completion of work procedures
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items

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Context of and specific resources for assessment **9.3)**

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and method and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with **9.5)**

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other units

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Inspection should be planned with the appropriate parties to determine access, conditions and work requirements.

Equipment may refer to PLC's, I/O modules, VDU's, DCS equipment, soft start motor starters, alarms, stabilised power units and uninterrupted power supply units.

Materials may refer to insulation tapes, heat shrink, sleeving, spiral binding, cable ties, solder, lubricants, oil, greases, sealants, lugs, connectors, terminal blocks, cable markers and identification labels.

Components may include fuses/circuit breakers, timers, contactors, contacts, coils, relays, resistors, inductors, capacitors, bridge rectifiers, diodes, heat sinks, solenoids, overloads, plug in printed circuit boards, switches, plugs, cable and thermistors.

Test and measurement instruments may include multimeters, tong testers, insulation resistance/continuity tester, ductor tester, overload injection tester, growlers, cathode ray oscilloscope, variac, hand held programmer and frequency generator.

Work may be performed with equipment on line.

Work completion details may include plant and maintenance records, job cards, check sheets and on device labelling updates.

Work site environment may be affected by nearby plant or processes, e.g. heat, noise, dust, oil, water and chemical.

Isolations can refer to electrical/mechanical or other associated processes.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1.00 Preliminary Information and Glossaries.

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Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Maintenance

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UEPMNT350B Modify electrical equipment

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to perform modifications of electrical equipment and may include, but not be limited to, alterations, additions or adjustments.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit may require an electrical licence to practise in the workplace.

Practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
UEENEEG108A	Trouble-shoot and repair faults in low voltage electrical apparatus and circuits
UEENEEE101A	Apply Occupational Health Safety regulations, codes and practices in the workplace
UEENEEE107A	Use drawings, diagrams, schedules, standards, cords and specifications
UEENEEG006A	Solve problems in single and three phase low voltage machines
UEENEEG033A	Solve problems in single and three phase low voltage electrical apparatus and circuits
UEENEEG063A	Arrange circuits, control and protection for general electrical installations
UEENEEG101A	Solve problems in electromagnetic devices and related circuits
UEENEEG102A	Solve problems in low voltage a.c. circuits
UEENEEG106A	Terminate cables, cords and accessories for low voltage circuits

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Literacy and numeracy skills	**4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills	**5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT		PERFORMANCE CRITERIA	
1	Plan and prepare for the work	1.1	Work requirements are identified from request/work orders or equivalent and clarified/confirmed with appropriate parties or by site inspection
		1.2	Occupational Health and Safety standards, statutory requirements, relevant Australian standards, codes of practice, manufacturers’

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ELEMENT	PERFORMANCE CRITERIA	
		specifications, environmental requirements and enterprise procedures are identified, applied and monitored throughout the work procedure
	1.3	Resources required to satisfy the work plan are identified, obtained and inspected for compliance with the job specifications
	1.4	Relevant plans, drawings and texts are selected and interpreted in accordance with the work plan
	1.5	Correct size, type and quantity of materials/components are determined, obtained and inspected for compliance with the job specifications
	1.6	Work is planned in detail including sequencing and prioritising and considerations made, where appropriate, for the maintenance of plant security and capacity in accordance with system/site requirements
	1.7	Coordination requirements, including requests for isolations where appropriate, are resolved with others involved, affected or required by the work
	1.8	Potential hazards are identified and prevention and/or control measures are selected in accordance with the work plan and site procedures
	1.9	Work area is prepared in accordance with work requirements and site procedures
	1.10	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2 Carry out modification	2.1	Required isolations are confirmed where appropriate in accordance with site requirements
	2.2	Equipment is modified using appropriate plans, drawings and texts in accordance with the work plan

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ELEMENT	PERFORMANCE CRITERIA	
	2.3	Equipment is modified in conjunction with others involved in, or affected by, the work in accordance with the work plan
	2.4	Modifications are carried out mindful of effects on or unnecessary loss of other equipment in accordance with the work plan
	2.5	Modified equipment is set up to suit operational requirements and in accordance with manufacturer specifications and the work plan
	2.6	Final job inspection is performed and permits relinquished as required in accordance with the work plan
3 Complete the work	3.1	Work is completed and appropriate personnel notified in accordance with site/enterprise requirements
	3.2	Work area is cleared of waste, cleaned, restored and secured in accordance with site/enterprise procedures
	3.3	Plant, tools and equipment are maintained and stored in accordance with site/enterprise procedures
	3.4	Work completion details are finalised in accordance with site/enterprise procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired in modifying electrical equipment.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

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REQUIRED SKILLS AND KNOWLEDGE

KS01-PM350B Modify electrical equipment

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant Environmental, Occupational Health and Safety legislation and regulations
- Relevant plant and equipment, its location
- Technical drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Relevant state and territory regulations
- Relevant Australian standards;
- Equipment and material required to perform the work;
- Isolation procedures;
- Modification techniques;
- Electrical equipment;
- Regulatory procedures;
- Electrical principles;
- Test and measurement instruments;
- Engineering and workshop practice;
- Communication principles

T2 Specific skills needed to achieve the Performance Criteria:

- Apply Relevant Environmental, Occupational Health and Safety legislation and regulations
- Interpret Technical drawings and manufacturers manuals
- Apply relevant state and territory regulations
- Apply relevant Australian standards;
- Use tools and relevant equipment;
- Use test and measurement instruments;
- Modify electrical equipment;
- Select materials for the job;
- Apply electrical principles;
- Carry out work completion details;
- Communicate effectively.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the range statement of

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EVIDENCE GUIDE

the competency standard unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace, however, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be ‘rich’ in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its ‘richness’. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

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Critical aspects of evidence required to demonstrate competency in this unit **9.2)**

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Preparation and planning of work
  - Modification techniques and procedures
  - Completion of work procedures
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items

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Context of and specific resources for assessment **9.3)**

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and method and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

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There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Inspection should be planned with the appropriate parties to determine access, conditions and work requirements.

Equipment may include a.c. motors, alternators, d.c. motors, generators, pumps, electro/mechanical motor starters, low voltage transformers/switchgear and associated control panels, motor operated valves, hoists and cranes, arc welders, resistive heaters, hot water units, exhaust fans, luminaries, batteries, metal detectors, general low voltage lighting, power circuits, control/indication and alarm circuits, electrical tools/appliances, workshop machinery and compressors.

Materials may include masonry anchors, bolts, nuts, washers, screws, rivets, saddles, clips, brackets, solvents, adhesives, insulation tapes, heat shrink, sleeving, spiral binding, cable ties, solder, lubricants, oils, greases, sealants, lugs, connectors, terminal blocks, cable markers and identification labels.

Components may include fuses/circuit breakers, earth leakage breakers, timers, contactors, contacts, coils, relays, resistors, ballasts, capacitors, solenoids, overloads, switches, plugs, busbar, cable, fans, thermostats, elements, seals, motor bearings and brushgear.

Test and measurement instruments may include multimeters, tong testers, insulation resistance/continuity tester, ductor tester, overload injection tester and growlers.

Work may be performed with equipment on line.

Work completion details may include plant and maintenance records, job cards, check sheets and on device labelling updates.

Work site environment may be affected by nearby plant or processes, e.g. heat, noise, dust, oil, water and chemical.

Isolations can refer to electrical/mechanical or other associated processes.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1.00 Preliminary Information

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RANGE STATEMENT

and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Maintenance

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UEPMNT351B Test and commission electrical equipment

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to conduct testing and commissioning of electrical wiring systems and equipment.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit may require an electrical licence to practise in the workplace.

Practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

Pre-Requisites

Prerequisite Unit(s) **4)**

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Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
UEENEEG108A	Trouble-shoot and repair faults in low voltage electrical apparatus and circuits
UEENEEE101A	Apply Occupational Health Safety regulations, codes and practices in the workplace
UEENEEE102A	Fabricate, dismantle, assemble of utilities industry components
UEENEEE104A	Solve problems in d.c. circuits
UEENEEE105A	Fix and secure electrotechnology equipment
UEENEEE107A	Use drawings, diagrams, schedules, standards, cords and specifications
UEENEEG006A	Solve problems in single and three phase low voltage machines
UEENEEG033A	Solve problems in single and three phase low voltage electrical apparatus and circuits
UEENEEG063A	Arrange circuits, control and protection for general electrical installations
UEENEEG101A	Solve problems in electromagnetic devices and related circuits
UEENEEG102A	Solve problems in low voltage a.c.

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Prerequisite Unit(s) **4)**

	circuits
UEENEEG106A	Terminate cables, cords and accessories for low voltage circuits

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA

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ELEMENT	PERFORMANCE CRITERIA	
1 Plan and prepare for the work	1.1	Work requirements are identified from request/work orders or equivalent and clarified/confirmed with appropriate parties or by site inspection
	1.2	Occupational Health and Safety standards, statutory requirements, relevant Australian standards, codes of practice, manufacturers' specifications, environmental requirements and enterprise procedures are identified, applied and monitored throughout the work procedure
	1.3	Resources required to satisfy the work plan are identified, obtained and inspected for compliance with the job specifications
	1.4	Relevant plans, drawings and texts are selected and interpreted in accordance with the work plan
	1.5	Correct size, type and quantity of materials/components are determined, obtained and inspected for compliance with the job specifications
	1.6	Work is planned in detail including sequencing and prioritising and considerations made, where appropriate, for the maintenance of plant security and capacity in accordance with system/site requirements
	1.7	Coordination requirements, including requests for isolations where appropriate, are resolved with others involved, affected or required by the work
	1.8	Potential hazards are identified and prevention and/or control measures are selected in accordance with the work plan and site procedures
	1.9	Work area is prepared in accordance with work requirements and site procedures
	1.10	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training

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ELEMENT	PERFORMANCE CRITERIA	
2 Test wiring systems	2.1	Required isolations are confirmed where appropriate in accordance with site requirements
	2.2	Wiring systems are tested using appropriate plans, drawings and texts in accordance with the work plan
	2.3	Wiring systems are tested in conjunction with others involved in, or affected by, the work in accordance with the work plan
	2.4	Wiring systems, including enclosures/supports, are inspected prior to testing to ensure absence of any damage, defects and/or signs of deterioration in accordance with the work plan
	2.5	Fixed wiring is tested as appropriate and results/observations are interpreted and documented to confirm compliance with job specifications
3 Test the equipment	3.1	Required isolations are confirmed where appropriate in accordance with site requirements
	3.2	Equipment is tested using appropriate plans, drawings and texts in accordance with the work plan
	3.3	Equipment is tested in conjunction with other involved in, or affected by, the work in accordance with the work plan
	3.4	Required test conditions are confirmed and the equipment is inspected to ensure absence of any damage, defects and/or signs of deterioration in accordance with the work plan
	3.5	Equipment is tested using appropriate test techniques in accordance with the work plan
	3.6	Equipment test results/observations are interpreted and documented to confirm compliance with job specifications
4 Commission the equipment	4.1	Required isolations are confirmed where appropriate in accordance with site requirements

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ELEMENT	PERFORMANCE CRITERIA	
	4.2	Equipment is commissioned using appropriate plans, drawings and texts in accordance with the work plan
	4.3	Equipment is commissioned in conjunction with others involved in, or affected by, the work in accordance with the work plan
	4.4	Equipment is set up in accordance with operational requirements/manufacturer specifications
	4.5	Testing and monitoring procedures are followed and results monitored, interpreted and documented to ensure equipment operates/functions within specifications
	4.6	Equipment is commissioned with due regard being paid to plant security and capacity in accordance with the work plan
	4.7	Final job inspection is carried out and permits relinquished as required in accordance with the work plan.
5 Complete the work	5.1	Work is completed and appropriate personnel notified in accordance with site/enterprise requirements
	5.2	Work area is cleared of waste, cleaned, restored and secured in accordance with site/enterprise procedures
	5.3	Plant, tools and equipment are maintained and stored in accordance with site/enterprise procedures
	5.4	Work completion details are finalised in accordance with site/enterprise procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

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REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired testing and commissioning electrical equipment.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PM351B Test and commission electrical equipment

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant Environmental, Occupational Health and Safety legislation and regulations
- Relevant plant and equipment, its location
- Technical drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Relevant state and territory regulations
- Relevant Australian standards
- Equipment and material required to perform the work
- Isolation procedures
- Testing and commissioning techniques and procedures
- Operational requirements of the equipment
- Electrical equipment
- Regulatory procedures
- Electrical principles
- Test and measurement instruments
- Engineering and electronic workshop practice

T2 Specific skills needed to achieve the Performance Criteria:

- Apply Relevant Environmental, Occupational Health and Safety legislation and regulations
- Interpret Technical drawings and manufacturers manuals
- Apply relevant state and territory regulations
- Apply relevant Australian standards
- Use and update plans, drawings and texts
- Use tools and relevant equipment
- Use test and measurement instruments
- Inspect and test the wiring systems
- Inspect, test and monitor equipment
- Commission electrical equipment
- Select materials for the job

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REQUIRED SKILLS AND KNOWLEDGE

- Apply electrical principles
- Communicate effectively
- Apply data analysis techniques and tools
- Apply engineering and electronic workshop practices

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the range statement of the competency standard unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace, however, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be ‘rich’ in nature so as to minimise error in judgment.

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Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory

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legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
- Preparation and planning of work
- Testing techniques
- Commissioning procedures
- Completion of work procedures
- Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and method and in a variety of environments.

Method of assessment

9.4)

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is

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expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Inspection should be planned with the appropriate parties to determine access, conditions and work requirements.

Equipment may include a.c. motors, alternators, d.c. motors, generators, pumps, electro/mechanical motor starters, low voltage transformers/switchgear and associated control panels, motor operated valves, hoists and cranes, arc welders, resistive heaters, hot water units, exhaust fans, luminaries, batteries, metal detectors, general low voltage lighting, power circuits, control/indication and alarm circuits, electrical tools/appliances, workshop machinery and compressors.

Materials may include masonry anchors, bolts, nuts, washers, screws, rivets, saddles, clips, brackets, solvents, adhesives, insulation tapes, heat shrink, sleeving, spiral binding, cable ties, solder, lubricants, oils, greases, sealants, lugs, connectors, terminal blocks, cable markers and identification labels

Components may include fuses/circuit breakers, earth leakage breakers, timers, contactors, contacts, coils, relays, resistors, ballasts, capacitors, solenoids, overloads, switches, plugs, busbar, cable, fans, thermostats, elements, seals, motor bearings and brushgear.

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RANGE STATEMENT

Fixed wiring tests may refer to polarity, loop impedance and insulation resistance/continuity tests.

Monitoring equipment may refer to stopwatch, indication lamps, tachometer/rev counter and audio signals.

Work may be performed with equipment on line.

Work completion details may include plant and maintenance records, job cards, check sheets and on device labelling updates.

Work site environment may be affected by nearby plant or processes, e.g. heat, noise, dust, oil, water and chemical.

Isolations can refer to electrical/mechanical or other associated processes.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1.00 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Maintenance

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UEPMNT352B Test and commission electronic electrical equipment

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to conduct testing and commissioning of electrical electronic equipment.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit may require an electrical licence to practise in the workplace.

Practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
UEENEEG108A	Trouble-shoot and repair faults in low voltage electrical apparatus and circuits
UEENEEE101A	Apply Occupational Health Safety regulations, codes and practices in the workplace
UEENEEE102A	Fabricate, dismantle, assemble of utilities industry components
UEENEEE104A	Solve problems in d.c. circuits
UEENEEE105A	Fix and secure electrotechnology equipment
UEENEEE107A	Use drawings, diagrams, schedules, standards, cords and specifications
UEENEEG006A	Solve problems in single and three phase low voltage machines
UEENEEG033A	Solve problems in single and three phase low voltage electrical apparatus and circuits
UEENEEG063A	Arrange circuits, control and protection for general electrical installations
UEENEEG101A	Solve problems in electromagnetic devices and related circuits

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Prerequisite Unit(s) **4)**

UEENEEG102A	Solve problems in low voltage a.c. circuits
UEENEEG106A	Terminate cables, cords and accessories for low voltage circuits

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and prepare for the work	1.1 Work requirements are identified from request/work orders or equivalent and clarified/confirmed with appropriate parties or by site inspection
	1.2 Occupational Health and Safety standards, statutory requirements, relevant Australian standards, codes of practice, manufacturers' specifications, environmental requirements and enterprise procedures are identified, applied and monitored throughout the work procedure
	1.3 Resources required to satisfy the work plan are identified, obtained and inspected for compliance with the job specifications
	1.4 Relevant plans, drawings and texts are selected and interpreted in accordance with the work plan
	1.5 Correct size, type and quantity of materials/components are determined, obtained and inspected for compliance with the job specifications
	1.6 Work is planned in detail including sequencing and prioritising and considerations made, where appropriate, for the maintenance of plant security and capacity in accordance with system/site requirements
	1.7 Coordination requirements, including requests for isolations where appropriate, are resolved with others involved, affected or required by the work
	1.8 Potential hazards are identified and prevention and/or control measures are selected in accordance with the work plan and site procedures
	1.9 Work area is prepared in accordance with work requirements and site procedures
	1.10 Where appropriate, the teams and individuals roles and responsibilities within the team are

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ELEMENT	PERFORMANCE CRITERIA	
		identified and, where required, assist in the provision of the on-the-job training
2 Test wiring systems	2.1	Required isolations are confirmed where appropriate in accordance with site requirements
	2.2	Wiring systems are tested using appropriate plans, drawings and texts in accordance with the work plan
	2.3	Wiring systems are tested in conjunction with others involved in, or affected by, the work in accordance with the work plan
	2.4	Wiring systems, including enclosures/supports, are inspected prior to testing to ensure absence of any damage, defects and/or signs of deterioration in accordance with the work plan
	2.5	Fixed wiring is tested as appropriate and results/observations are interpreted and documented to confirm compliance with job specifications.
3 Test the equipment	3.1	Required isolations are confirmed where appropriate in accordance with site requirements
	3.2	Equipment is tested using appropriate plans, drawings and texts in accordance with the work plan
	3.3	Equipment is tested in conjunction with other involved in, or affected by, the work in accordance with the work plan
	3.4	Required test conditions are confirmed and the equipment is inspected to ensure absence of any damage, defects and/or signs of deterioration in accordance with the work plan
	3.5	Equipment is tested using appropriate test techniques in accordance with the work plan
	3.6	Equipment test results/observations are interpreted and documented to confirm compliance with job specifications

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ELEMENT	PERFORMANCE CRITERIA
4 Commission the equipment	4.1 Required isolations are confirmed where appropriate in accordance with site requirements
	4.2 Equipment is commissioned using appropriate plans, drawings and texts in accordance with the work plan
	4.3 Equipment is commissioned in conjunction with others involved in, or affected by, the work in accordance with the work plan
	4.4 Equipment is set up in accordance with operational requirements/manufacturer specifications
	4.5 Testing and monitoring procedures are followed and results monitored, interpreted and documented to ensure equipment operates/functions within specifications
	4.6 Equipment is commissioned with due regard being paid to plant security and capacity in accordance with the work plan
	4.7 Final job inspection is carried out and permits relinquished as required in accordance with the work plan
5 Complete the work	5.1 Work is completed and appropriate personnel notified in accordance with site/enterprise requirements
	5.2 Work area is cleared of waste, cleaned, restored and secured in accordance with site/enterprise procedures
	5.3 Plant, tools and equipment are maintained and stored in accordance with site/enterprise procedures
	5.4 Work completion details are finalised in accordance with site/enterprise procedures

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired testing and commissioning electronic electrical equipment.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PM352B Test and commission electronic electrical equipment

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant Environmental, Occupational Health and Safety legislation and regulations
- Relevant plant and equipment, its location
- Technical drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Relevant state and territory regulations
- Relevant Australian standards
- Equipment and material required to perform the work
- Isolation procedures
- Layout of plant/work site and operation of its equipment
- Testing and commissioning techniques and procedures
- Operational requirements of the equipment
- Electronic electrical equipment
- Electronic principles
- Electrical principles
- Test and measurement instruments
- Engineering and electronic workshop practice

T2 Specific skills needed to achieve the Performance Criteria:

- Apply Relevant Environmental, Occupational Health and Safety legislation and regulations
- Interpret Technical drawings and manufacturers manuals
- Apply relevant state and territory regulations
- Apply relevant Australian standards
- Use tools and relevant equipment
- Use test and measurement instruments
- Inspect and test the wiring systems
- Inspect, test and monitor equipment

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REQUIRED SKILLS AND KNOWLEDGE

- Commission electronic electrical equipment
- Select materials for the job
- Apply electrical principles
- Apply electronic principles
- Communicate effectively
- Apply data analysis techniques and tools
- Apply engineering and electronic workshop practices

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the range statement of the competency standard unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace, however, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical

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equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of

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contexts from the prescribed items below:

- The knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
- Preparation and planning of work
- Testing techniques
- Commissioning procedures
- Completion of work procedures
- Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and method and in a variety of environments.

Method of assessment

9.4)

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

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Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Inspection should be planned with the appropriate parties to determine access, conditions and work requirements

Equipment may refer to PLC’s, I/O modules, DCS equipment, VDU’s, soft start motor starters, alarms, stabilised power supply units and uninterrupted power supply units

Materials may refer to insulation tapes, heat shrink, sleeving, spiral binding, cable ties, solder, lubricants, oil, greases, sealants, lugs, connectors, terminal blocks, cable markers and identification labels

Components may include fuses/circuit breakers, timers, contactors, contacts, coils, relays, resistors, inductors, capacitors, bridge rectifiers, diodes, heat sinks, solenoids, overloads, plug in printed circuit boards, switches, plugs, cable and thermistors

Fixed wiring tests can refer to polarity, loop impedance and insulation resistance/continuity tests

Monitoring equipment may include stopwatch, indication lamps, tachometer/rev counter, LED displays, VDUs, thermometers, mimic panels, position indicators, audio

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RANGE STATEMENT

indicators and chart recorders

Work may be performed with equipment on line

Work completion details may include plant and maintenance records, job cards, check sheets and on device labelling updates

Work site environment may be affected by nearby plant or process, e.g. heat, noise, dust, oil, water and chemical

Isolations can refer to electrical/mechanical or other associated processes

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1.00 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Maintenance

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UEPMNT355B Install complex/electronic instrumentation equipment

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to undertake installation of instrumentation equipment used in a “multi-loop” configuration, including, but not limited to, signal characterising equipment, totaliser units, microprocessor control equipment, interface equipment, laboratory and field analysers, ultrasonic and nucleonics equipment.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit may require an electrical licence to practise in the workplace.

Practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
UEENEEI008C	Install process control apparatus and associated equipment
UEENEEI001B	Install and set up transducers and sensing devices
UEENEEE002B	Dismantle, assemble and fabricate electrotechnology components
UEENEEE005B	Fix and secure equipment
UEENEEE007B	Use drawings, diagrams, schedules and manuals

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

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Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and prepare for the work	1.1 Work requirements are identified from request/work orders or equivalent and clarified/confirmed with appropriate parties or by site inspection
	1.2 Occupational Health and Safety standards, statutory requirements, relevant Australian standards, codes of practice, manufacturers' specifications, environmental requirements and enterprise procedures are identified, applied and monitored throughout the work procedure
	1.3 Resources required to satisfy the work plan are identified, obtained and inspected for compliance with the job specifications
	1.4 Relevant plans, drawings and texts are selected and interpreted in accordance with the work plan
	1.5 Correct size, type and quantity of materials/components are determined, obtained and inspected for compliance with the job

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ELEMENT	PERFORMANCE CRITERIA	
		specifications
	1.6	Work is planned in detail including sequencing and prioritising and considerations made, where appropriate, for the maintenance of plant security and capacity in accordance with system/site requirements
	1.7	Coordination requirements, including requests for isolations where appropriate, are resolved with others involved, affected or required by the work
	1.8	Potential hazards are identified and prevention and/or control measures are selected in accordance with the work plan and site procedures
	1.9	Work area is prepared in accordance with work requirements and site procedures
	1.10	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2 Install the equipment	2.1	Required isolations are confirmed where appropriate in accordance with site requirements
	2.2	Equipment is assembled, positioned and secured in accordance with appropriate plans, drawings and texts
	2.3	Equipment is installed in conjunction with others involved or affected by the work in accordance with the work plan
	2.5	Conductors are run, secured, glanded and terminated to appropriate specifications in accordance with the work plan
	2.6	Final job inspection is carried out and any permits relinquished in accordance with the work plan.
3 Complete the work	3.1	Work is completed and appropriate personnel notified in accordance with site/enterprise

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ELEMENT	PERFORMANCE CRITERIA	
		requirements
	3.2	Work area is cleared of waste, cleaned, restored and secured in accordance with site/enterprise procedures
	3.3	Plant, tools and equipment are maintained and stored in accordance with site/enterprise procedures
	3.4	Work completion details are finalised in accordance with site/enterprise procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired in installing complex / electronic instrumentation equipment.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PM355B Complex/electronic instrumentation equipment

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant Environmental, Occupational Health and Safety legislation and regulations
- Relevant plant and equipment, its location
- Technical drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Relevant state and territory regulations
- Relevant Australian standards
- Equipment and material required to perform the work
- Isolation procedures
- Installation requirements of the equipment
- Electrical fundamentals
- Test and measurement instruments
- Engineering and electronic workshop practice

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REQUIRED SKILLS AND KNOWLEDGE

- Instrumentation principles and practices

T2 Specific skills needed to achieve the Performance Criteria:

- Apply Relevant Environmental, Occupational Health and Safety legislation and regulations
- Interpret Technical drawings and manufacturers manuals
- Apply relevant state and territory regulations
- Apply relevant Australian standards
- Use tools and relevant equipment
- Use test and measurement instruments
- Use correct termination procedures
- Use correct installation procedures
- Identify and select relevant materials
- Carry out work completion details
- Apply electrical fundamentals
- Communicate effectively
- Apply engineering and workshop practices

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the range statement of the competency standard unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or in a realistically simulated work environment. It is

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recognised that, in some circumstances, assessment in part or full can occur outside the workplace, however, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and

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Range Statement

- Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
- Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
- Demonstrate an appropriate level of employability skills
- Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures

- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Preparation and planning of work
  - Installation techniques and procedures
  - Completion of work procedures
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different

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structural/construction types and method and in a variety of environments.

Method of assessment

9.4)

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Inspection should be planned with the appropriate parties to determine access, conditions and work requirements.

Equipment may include CO2, H2, pH, dissolved O2, conductivity and optical density analysers, recorders, nuclear devices, smart transmitters, magflow meters, coal feeders, belt weigher, PLC’s, ultrasonic sensors, hydraulic control equipment, turbine

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RANGE STATEMENT

supervisory equipment detectors, test equipment, transducers, pneumatic controllers, fire panels, T/C converters, electronic controllers, wear monitors, printers, printer circuit boards, UV sterilisation equipment, gas detection equipment and surge suppression equipment.

Materials may include fixings such as bolts, nuts, screws, masonry anchors, cable and tube anchors, flexible multicore cable, brackets, cleaning solvents, lugs such as solder, non-insulated crimp and pre-insulated crimp, connectors such as wire termination devices, co-axial, multi-pin plug and socket, tag strips, pins and spades, tube termination devices, tube-tube connectors and bulkhead-tube, soft solder and fluxes.

Test and measurement instruments may include insulation testers, multimeters and hand-held programmers.

Installation includes the entering of programs and/or parameters into equipment, where required.

Work completion details may include plant and maintenance records, job cards, check sheets, on device labelling updates and reporting and/or documenting equipment defects.

Work site environment may be affected by nearby plant or processes, e.g. chemical, heat, dust, noise, gas and oil.

Isolations can refer to electrical/mechanical or other associated processes.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1.00 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Maintenance

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UEPMNT356B Maintain instrumentation equipment

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to undertake maintenance of instrumentation equipment including, but not limited to, process measurement and control and analytical instrumentation.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit may require an electrical licence to practise in the workplace.

Practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
UEENEEI001B	Install and set up transducers and sensing devices
UEENEEE002B	Dismantle, assemble and fabricate electrotechnology components
UEENEEE005B	Fix and secure equipment
UEENEEE007B	Use drawings, diagrams, schedules and manuals

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability

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Employability Skills	**5)** Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and prepare for the work	1.1 Work requirements are identified from request/work orders or equivalent and clarified/confirmed with appropriate parties or by site inspection
	1.2 Occupational Health and Safety standards, statutory requirements, relevant Australian standards, codes of practice, manufacturers' specifications, environmental requirements and enterprise procedures are identified, applied and monitored throughout the work procedure
	1.3 Resources required to satisfy the work plan are identified, obtained and inspected for compliance with the job specifications
	1.4 Relevant plans, drawings and texts are selected and interpreted in accordance with the work plan
	1.5 Correct size, type and quantity of materials/components are determined, obtained and inspected for compliance with the job specifications
	1.6 Work is planned in detail including sequencing and prioritising and considerations made, where appropriate, for the maintenance of plant

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ELEMENT	PERFORMANCE CRITERIA	
		security and capacity in accordance with system/site requirements
	1.7	Coordination requirements, including requests for isolations where appropriate, are resolved with others involved, affected or required by the work
	1.8	Potential hazards are identified and prevention and/or control measures are selected in accordance with the work plan and site procedures
	1.9	Work area is prepared in accordance with work requirements and site procedures
	1.10	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2 Carry out maintenance	2.1	Required isolations are confirmed where appropriate in accordance with site requirements
	2.2	Equipment is maintained using appropriate plans, drawings and texts in accordance with the work plan
	2.3	Equipment is maintained in conjunction with others involved in, or affected by, the work in accordance with the work plan
	2.4	Calibration and/or adjustments required are carried out to ensure equipment operates within requirements in accordance with the work plan
	2.5	Maintenance and calibration/adjustments carried out mindful of effects on, or unnecessary loss of, other equipment
	2.6	Final job inspection is carried out and permits relinquished in accordance with the work plan.
3 Complete the work	3.1	Work is completed and appropriate personnel notified in accordance with site/enterprise requirements

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ELEMENT	PERFORMANCE CRITERIA
	3.2 Work area is cleared of waste, cleaned, restored and secured in accordance with site/enterprise procedures
	3.3 Plant, tools and equipment are maintained and stored in accordance with site/enterprise procedures
	3.4 Work completion details are finalised in accordance with site/enterprise procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired in maintaining instrumentation equipment.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PM356B Instrumentation equipment

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant Environmental, Occupational Health and Safety legislation and regulations
- Relevant plant and equipment, its location
- Technical drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Relevant state and territory regulations
- Relevant Australian standards;
- Equipment and material required to perform the work;
- Isolation procedures;
- Maintenance techniques for the equipment;
- Instrumentation principles and practices
- Instrument calibration techniques
- Instrumentation equipment;
- Electrical fundamentals;

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REQUIRED SKILLS AND KNOWLEDGE

- Test and measurement of instruments;
- Instrument installation practice;
- Engineering and workshop practice;

T2 Specific skills needed to achieve the Performance Criteria:

- Apply Relevant Environmental, Occupational Health and Safety legislation and regulations
- Interpret Technical drawings and manufacturers manuals
- Apply relevant state and territory regulations
- Apply relevant Australian standards;
- Apply instrumentation principles and practices
- Apply instrument calibration techniques
- Use tools and relevant equipment;
- Use test and measurement instruments;
- Use correct maintenance procedures;
- Use correct calibration procedures;
- Identify and select materials for the job;
- Apply electrical fundamentals
- Carry out work completion details;
- Communicate effectively;
- Apply data analysis techniques and tools.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the range statement of the competency standard unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment	**9.1)**
	Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment

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intervention. It is the Industry preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace, however, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this

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shall incorporate evidence that shows a candidate is able to:

- Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
- Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
- Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
- Demonstrate an appropriate level of employability skills
- Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures

- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Preparation and planning of work
  - Maintenance techniques and procedures
  - Completion of work procedures
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of

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work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and method and in a variety of environments.

Method of assessment

9.4)

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Inspection should be planned with the appropriate parties to determine access,

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RANGE STATEMENT

conditions and work requirements.

Equipment may include gauges, transmitters, switches, thermocouples, RTD's, thermostats, indicators, meters, proximity probes, indication slide wires, control valves, valve positioners, lock up valves, power cylinders, power cylinder positioners, I/P and E/P converters, air relays, pressure regulators, solenoid valves, analogue indicators, fire detectors, smoke detectors, vibration detectors, gas detectors and fuel valves.

Materials may include lubricants, cleaning solvents, gasket materials and lead test solution.

Components may include hair springs, gauge movements, pneumatic restrictors, air relays, microswitches, flapper/nozzles, diaphragms, springs, bellows, gaskets, shuttle valves, pilot valves, amplifier modules, coils and plug in printed circuit boards.

Test and measurement instruments may include dead weight tester, pneumatic calibrator, vacuum pump gauge/, manometer, precision pressure gauge, hand-held pressure pump, comparator, temperature baths, oven, multimeter, variable power supply, d.c. I/V standard, potentiometer and decade box.

Work may be performed with equipment on line.

Work completion details may include plant and maintenance records, job cards, check sheets and on device labelling updates.

Work site environment may be affected by nearby plant or processes, e.g. heat, noise, dust, oil, water and chemical.

Isolations can refer to electrical/mechanical or other associated processes.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1.00 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Maintenance

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UEPMNT357B Diagnose and repair faults in instrumentation equipment

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to undertake to diagnose and repair instrumentation equipment, including, but not limited to, sensor elements, signal characterising equipment, input/output blocks, controllers, transducers and final elements.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit may require an electrical licence to practise in the workplace.

Practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
UEENEEI001B	Install and set up transducers and sensing devices
UEENEEE002B	Dismantle, assemble and fabricate electrotechnology components
UEENEEE005B	Fix and secure equipment
UEENEEE007B	Use drawings, diagrams, schedules and manuals

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of

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Employability Skills	**5)** competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and prepare for the work	1.1 Work requirements are identified from request/work orders or equivalent and clarified/confirmed with appropriate parties or by site inspection
	1.2 Occupational Health and Safety standards, statutory requirements, relevant Australian standards, codes of practice, manufacturers' specifications, environmental requirements and enterprise procedures are identified, applied and monitored throughout the work procedure
	1.3 Resources required to satisfy the work plan are identified, obtained and inspected for compliance with the job specifications
	1.4 Relevant plans, drawings and texts are selected and interpreted in accordance with the work plan
	1.5 Correct size, type and quantity of materials/components are determined, obtained and inspected for compliance with the job specifications
	1.6 Work is planned in detail including sequencing and prioritising and considerations made, where

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ELEMENT	PERFORMANCE CRITERIA	
		appropriate, for the maintenance of plant security and capacity in accordance with system/site requirements
	1.7	Coordination requirements, including requests for isolations where appropriate, are resolved with others involved, affected or required by the work
	1.8	Potential hazards are identified and prevention and/or control measures are selected in accordance with the work plan and site procedures
	1.9	Work area is prepared in accordance with work requirements and site procedures
	1.10	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2 Verify the fault	2.1	Normal performance and function of the equipment is ascertained by consulting appropriate reference sources in accordance with the work plan
	2.2	Fault indicators, appropriate technical information/diagnostic techniques are used to verify reported symptoms/faults in accordance with the work plan
	2.3	Symptoms are reproduced and monitored if possible, whilst due regard for personnel safety and plant security is observed in accordance with the work plan
3 Find the fault	3.1	Required isolations are confirmed where appropriate in accordance with site requirements
	3.2	Fault finding is carried out in conjunction with others involved in or affected by the work in accordance with enterprise/job requirements
	3.3	Equipment components, wires, cables, terminations and support fixings are inspected for obvious faults in accordance with the work

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ELEMENT	PERFORMANCE CRITERIA	
		plan
	3.4	All appropriate fault finding/diagnostic techniques are identified, selected and used to determine the fault in accordance with the work plan
	3.5	All appropriate components are disconnected to enable accurate test measurements of suspected faulty components without the concern of "back feed" readings in accordance with the work plan
	3.6	Test and measurement instruments are used in accordance with manufacturer instructions and job requirements
4 Determine cause of fault	4.1	All appropriate personnel are consulted in order to obtain as many details relating to the faulty equipment as possible in accordance with the work plan
	4.2	Appropriate use is made of any information from fault indicators and maintenance records in accordance with the work plan
	4.3	Valid conclusions about the nature and cause of the fault are reached from analysis of available evidence in accordance with the work plan
5 Repair or rectify the fault	5.1	Required isolations are confirmed where appropriate in accordance with site requirements
	5.2	Appropriate repair procedures are undertaken in conjunction with others involved in, or affected by, the work in accordance with the work plan
	5.3	Faulty, worn, damaged or unsecured components are replaced, repaired or secured in accordance with the work plan
	5.4	Parts and components are selected and replaced as required in accordance with appropriate specifications and the work plan
	5.5	Components disconnected for testing are reconnected having been proven free of faults and all terminations are then checked to ensure they are electrically and mechanically sound in

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ELEMENT	PERFORMANCE CRITERIA	
		accordance with the work plan
	5.6	All faults are repaired or rectified in accordance with the work plan
	5.7	Final job inspection is performed and permits are relinquished as required in accordance with the work plan
6 Complete the work	6.1	Work is completed and appropriate personnel notified in accordance with site/enterprise requirements
	6.2	Work area is cleared of waste, cleaned, restored and secured in accordance with site/enterprise procedures
	6.3	Plant, tools and equipment are maintained and stored in accordance with site/enterprise procedures
	6.4	Work completion details are finalised in accordance with site/enterprise procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired in diagnosing and repairing faults in instrumentation equipment.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PM357B Diagnose and repair faults in instrumentation equipment

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant Environmental, Occupational Health and Safety legislation and regulations
- Relevant plant and equipment, its location

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REQUIRED SKILLS AND KNOWLEDGE

- Technical drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Relevant state and territory regulations
- Relevant Australian standards;
- Equipment and material required to perform the work;
- Isolation procedures;
- Instrumentation principles and practices
- Instrument calibration techniques
- Fault finding and diagnostic techniques;
- Repair techniques;
- Instrumentation equipment;
- Electrical fundamentals;
- Test and measurement instruments;
- Engineering and electronic workshop practice;

T2 Specific skills needed to achieve the Performance Criteria:

- Apply Relevant Environmental, Occupational Health and Safety legislation and regulations
- Interpret Technical drawings and manufacturers manuals
- Apply relevant state and territory regulations
- Apply relevant Australian standards;
- Use tools and relevant equipment;
- Use test and measurement instruments;
- Verify and identify faults;
- Use appropriate fault finding and diagnostic techniques;
- Determine the cause of faults;
- Repair faults;
- Identify and select materials for the job;
- Apply regulatory aspects theory;
- Apply electrical fundamentals
- Instrumentation principles and practices
- Instrument calibration techniques
- Carry out work completion details;
- Communicate effectively;
- Apply data analysis techniques and tools;
- Apply engineering and electronic workshop practices

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Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the range statement of the competency standard unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace, however, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be ‘rich’ in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its ‘richness’. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

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Critical aspects of evidence required to demonstrate competency in this unit **9.2)**

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Preparation and planning of work
  - Verification techniques
  - Diagnostic and fault finding techniques and procedures
  - Repair techniques and procedures
  - Completion of work procedures
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions

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incorporated in the holistic assessment with the above listed items

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment and different structural/ construction types and method and in a variety of environments.

Method of assessment

9.4)

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

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Concurrent assessment and relationship with other units	**9.5)**
	There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.
	Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Inspection should be planned with the appropriate parties to determine access, conditions and work requirements.

Equipment may include gauges, transmitters, switches, thermocouples, RTD's, thermostats, indicators, meters, proximity probes, indication slide wires, control valves, valve positioners, lock up valves, power cylinders, power cylinder positioners, I/P and E/P converters, air relays, pressure regulators, solenoid valves, analogue indicators, fire detectors, smoke detectors, vibration detectors, gas detectors and fuel valves.

Materials may include lubricants, cleaning solvents, gasket materials, leak test solution, connectors and fittings.

Components may include hair springs, gauge movements, pneumatic restrictors, air relays, microswitches, flapper/nozzles, diaphragms, springs, bellows, gaskets, shuttle valves, pilot valves, amplifier modules, coils and plug in printed circuit boards.

Test and measurement instruments may include dead weight tester, pneumatic calibrator, vacuum pump gauge, manometer, precision pressure gauge, hand-held pressure pump, comparator, temperature baths, oven, multimeter, variable power supply, d.c. I/V standard, potentiometer and decade box.

Fault finding and diagnostic techniques may include linear approach, half split rule, sensory detection, insulation/resistance and continuity tests.

Fault indicators may include indication lamps, LEDs, alarms and flag relays.

Work may be performed with equipment on line.

Work completion details may include plant and maintenance records, job cards, check sheets and on device labelling updates.

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RANGE STATEMENT

Work site environment may be affected by nearby plant or processes, e.g. heat, noise, dust, oil, water and chemical.

Isolations can refer to electrical/mechanical or other associated processes.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1.00 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Maintenance

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UEPMNT358B Modify instrumentation equipment

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to conduct modification of instrumentation equipment, including, but not limited to, sensor elements, signal characterising equipment, input/output blocks, controllers, transducers, final elements.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit may require an electrical licence to practise in the workplace.

Practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
UEENEEI001B	Install and set up transducers and sensing devices
UEENEEE002B	Dismantle, assemble and fabricate electrotechnology components
UEENEEE005B	Fix and secure equipment
UEENEEE007B	Use drawings, diagrams, schedules and manuals

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability

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Employability Skills	**5)** Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and prepare for the work	1.1 Work requirements are identified from request/work orders or equivalent and clarified/confirmed with appropriate parties or by site inspection
	1.2 Occupational Health and Safety standards, statutory requirements, relevant Australian standards, codes of practice, manufacturers' specifications, environmental requirements and enterprise procedures are identified, applied and monitored throughout the work procedure
	1.3 Resources required to satisfy the work plan are identified, obtained and inspected for compliance with the job specifications
	1.4 Relevant plans, drawings and texts are selected and interpreted in accordance with the work plan
	1.5 Correct size, type and quantity of materials/components are determined, obtained and inspected for compliance with the job specifications
	1.6 Work is planned in detail including sequencing and prioritising and considerations made, where appropriate, for the maintenance of plant

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ELEMENT	PERFORMANCE CRITERIA	
		security and capacity in accordance with system/site requirements
	1.7	Coordination requirements, including requests for isolations where appropriate, are resolved with others involved, affected or required by the work.
	1.8	Potential hazards are identified and prevention and/or control measures are selected in accordance with the work plan and site procedures
	1.9	Work area is prepared in accordance with work requirements and site procedures
	1.10	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2 Carry out modification	2.1	Required isolations are confirmed where appropriate in accordance with site requirements
	2.2	Equipment is modified using appropriate plans, drawings and texts in accordance with the work plan
	2.3	Equipment is modified in conjunction with others involved in, or affected by, the work in accordance with the work plan
	2.4	Modifications are carried out mindful of effects on or unnecessary loss of other equipment in accordance with the work plan
	2.5	Modified equipment is set up to suit operational requirements and in accordance with manufacturer specifications and the work plan
	2.6	Final job inspection is performed and permits relinquished as required in accordance with the work plan
3 Complete the work	3.1	Work is completed and appropriate personnel notified in accordance with site/enterprise requirements

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ELEMENT	PERFORMANCE CRITERIA	
	3.2	Work area is cleared of waste, cleaned, restored and secured in accordance with site/enterprise procedures
	3.3	Plant, tools and equipment are maintained and stored in accordance with site/enterprise procedures
	3.4	Work completion details are finalised in accordance with site/enterprise procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired in modifying instrumentation equipment.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PM358B Modify instrumentation equipment

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant Environmental, Occupational Health and Safety legislation and regulations
- Relevant plant and equipment, its location
- Technical drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Relevant state and territory regulations
- Relevant Australian standards;
- Equipment and material required to perform the work;
- Isolation procedures;
- Modification techniques;
- Instrumentation equipment and technology;
- Regulatory aspects;
- Instrumentation principles and practices
- Electrical fundamentals;

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REQUIRED SKILLS AND KNOWLEDGE

- Test and measurement instruments;
- Engineering and workshop practice;
- Communication principles

T2 Specific skills needed to achieve the Performance Criteria:

- Apply Relevant Environmental, Occupational Health and Safety legislation and regulations
- Interpret Technical drawings and manufacturers manuals
- Apply relevant state and territory regulations
- Apply relevant Australian standards;
- Modify instrumentation equipment;
- Use tools and relevant equipment;
- Use test and measurement instruments;
- Identify and select materials for the job;
- Apply instrumentation principles and practices
- Apply electrical fundamentals
- Carry out work completion details

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the range statement of the competency standard unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or in a realistically simulated work environment. It is

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recognised that, in some circumstances, assessment in part or full can occur outside the workplace, however, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and

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Range Statement

- Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
- Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
- Demonstrate an appropriate level of employability skills
- Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures

- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Preparation and planning of work
  - Modification techniques and procedures
  - Completion of work procedures
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different

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structural/construction types and method and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Inspection should be planned with the appropriate parties to determine access, conditions and work requirements.

Equipment may include gauges, transmitters, switches, thermocouples, RTDs, thermostats, indicators, meters, proximity probes, indication slide wires, control valves, valve positioners, lock up valves, power cylinders, power cylinder positioners,

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RANGE STATEMENT

I/P and E/P converters, air relays, pressure regulators, solenoid valves, analogue indicators, fire detectors, smoke detectors, vibration detectors, gas detectors and fuel valve.

Materials may include fixings such as bolts, nuts, screws, masonry anchors, cable and tube anchors, flexible multicore cable, brackets, cleaning solvents, lugs such as solder, non-insulated crimp and pre-insulated crimp, connectors such as wire termination devices, co-axial, multi-pin plug and socket, tag strips, pins and spades, tube termination devices, tube-tube connectors and bulkhead-tube, soft solder and flumes, lubricants, cleaning solvents, gasket materials, leak test solution, connectors and fittings.

Components may include hair springs, gauge movements, pneumatic restrictors, air relays, microswitches, flapper/nozzles, diaphragms, springs, bellows, gaskets, shuttle valves, pilot valves, amplifier modules, coils and plug in printed circuit boards.

Test and measurement instruments may include dead weight tester, pneumatic calibrator, vacuum pump gauge, manometer, precision pressure gauge, hand-held pressure pump, comparator, temperature baths, oven, multimeter, variable power supply, d.c. I/V standard, potentiometer and decade box.

Work completion details may include plant and maintenance records, job cards, check sheets and on device labelling updates.

Work site environment may be affected by nearby plant or processes, e.g. heat, noise, dust, oil, water and chemical. Isolations can refer to electrical/mechanical or other associated processes.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1.00 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Maintenance

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UEPMNT359B Test and commission instrumentation equipment

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to conduct testing and commissioning of instrumentation equipment including, but not limited to, sensor elements, signal characterising equipment, input/output blocks, controllers, transducers and final elements.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit may require an electrical licence to practise in the workplace.

Practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
UEENEEI001B	Install and set up transducers and sensing devices
UEENEEE002B	Dismantle, assemble and fabricate electrotechnology components
UEENEEE005B	Fix and secure equipment
UEENEEE007B	Use drawings, diagrams, schedules and manuals

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability

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Employability Skills	**5)** Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and prepare for the work	1.1 Work requirements are identified from request/work orders or equivalent and clarified/confirmed with appropriate parties or by site inspection
	1.2 Occupational Health and Safety standards, statutory requirements, relevant Australian standards, codes of practice, manufacturers' specifications, environmental requirements and enterprise procedures are identified, applied and monitored throughout the work procedure
	1.3 Resources required to satisfy the work plan are identified, obtained and inspected for compliance with the job specifications
	1.4 Relevant plans, drawings and texts are selected and interpreted in accordance with the work plan
	1.5 Correct size, type and quantity of materials/components are determined, obtained and inspected for compliance with the job specifications
	1.6 Work is planned in detail including sequencing and prioritising and considerations made, where appropriate, for the maintenance of plant

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ELEMENT	PERFORMANCE CRITERIA	
		security and capacity in accordance with system/site requirements
	1.7	Coordination requirements, including requests for isolations where appropriate, are resolved with others involved, affected or required by the work
	1.8	Potential hazards are identified and prevention and/or control measures are selected in accordance with the work plan and site procedures
	1.9	Work area is prepared in accordance with work requirements and site procedures
	1.10	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2 Test wiring systems	2.1	Required isolations are confirmed where appropriate in accordance with site requirements
	2.2	Wiring systems are tested using appropriate plans, drawings and texts in accordance with the work plan
	2.3	Wiring systems are tested in conjunction with others involved in, or affected by, the work in accordance with the work plan
	2.4	Wiring systems, including enclosures/ supports, are inspected prior to testing to ensure absence of any damage, defects and/or signs of deterioration in accordance with the work plan
	2.5	Fixed wiring is tested as appropriate and results/observations are interpreted and documented to confirm compliance with job specifications
3 Test piping and tubing systems	3.1	Required isolations are confirmed where appropriate in accordance with site requirements
	3.2	Piping and tubing systems are tested using appropriate plans, drawings and text in

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ELEMENT	PERFORMANCE CRITERIA	
		accordance with the work plan
	3.3	Piping and tubing systems are tested in conjunction with other involved in or affected by the work in accordance with the work plan
	3.4	Piping and tubing systems, including enclosures/supports, are inspected prior to testing to ensure absence of any damage, defects and/or signs of deterioration in accordance with the work plan
	3.5	Fixed piping and tubing is tested as appropriate and results/observations are interpreted and documented to confirm compliance with job specifications and the work plan
4 Test the equipment	4.1	Required isolations are confirmed where appropriate in accordance with site requirements
	4.2	Equipment is tested using appropriate plans, drawings and text in accordance with the work plan
	4.3	Equipment is tested in conjunction with other involved in or affected by the work in accordance with the work plan
	4.4	Required test conditions are confirmed and the equipment is inspected to ensure absence of any damage, defects and/or signs of deterioration in accordance with the work plan
	4.5	Equipment is tested using appropriate test techniques in accordance with the work plan
	4.6	Equipment test results/observations are interpreted and documented to confirm compliance with job specifications.
5 Commission the equipment	5.1	Required isolations are confirmed where appropriate in accordance with site requirements
	5.2	Equipment is commissioned using appropriate plans, drawings and text in accordance with the work plan

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ELEMENT	PERFORMANCE CRITERIA	
	5.3	Equipment is commissioned in conjunction with others involved in, or affected by, the work in accordance with the work plan
	5.4	Equipment is set up in accordance with operational requirements/manufacturer specifications
	5.5	Testing and monitoring procedures are followed and results monitored, interpreted and documented to ensure equipment operates/functions within specifications
	5.6	Equipment is commissioned with due regard being paid to plant security and capacity in accordance with the work plan
	5.7	Final job inspection is carried out and permits relinquished as required in accordance with the work plan
6 Complete the work	6.1	Work is completed and appropriate personnel notified in accordance with site/enterprise requirements
	6.2	Work area is cleared of waste, cleaned, restored and secured in accordance with site/enterprise procedures
	6.3	Plant, tools and equipment are maintained and stored in accordance with site/enterprise procedures
	6.4	Work completion details are finalised in accordance with site/enterprise procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

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REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired in testing and commissioning instrumentation systems.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PM359B Test and commission instrumentation equipment

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant Environmental, Occupational Health and Safety legislation and regulations
- Relevant plant and equipment, its location
- Technical drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Relevant state and territory regulations
- Relevant Australian standards;
- Equipment and material required to perform the work;
- Isolation procedures;
- Operating principles of the equipment;
- Testing and commissioning procedures and techniques;
- Operational requirements of the equipment;
- Instrumentation principles and practices
- Instrument calibration techniques
- Instrumentation systems;
- Regulatory aspects;
- Electrical fundamentals;
- Test and measurement instruments;

T2 Specific skills needed to achieve the Performance Criteria:

- Apply Relevant Environmental, Occupational Health and Safety legislation and regulations
- Interpret Technical drawings and manufacturers manuals
- Apply relevant state and territory regulations
- Apply relevant Australian standards;
- Use tools and relevant equipment;
- Use test and measurement instruments;
- Inspect and test the wiring systems;
- Inspect and test piping and tubing systems;
- Inspect, test and monitor equipment;
- Commission the equipment;
- Instrumentation principles and practices
- Instrument calibration techniques
- Identify and select materials for the job;
- Apply electrical fundamentals
- Carry out work completion details;

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Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the range statement of the competency standard unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace, however, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be ‘rich’ in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its ‘richness’. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment

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instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Preparation and planning of work
  - Testing techniques
  - Commissioning techniques and procedures
  - Completion of work procedures

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- Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items

Context of and specific resources for assessment **9.3)**

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and method and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

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Concurrent assessment and relationship with other units	**9.5)**
	There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.
	Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Inspection should be planned with the appropriate parties to determine access, conditions and work requirements.

Equipment may include gauges, transmitters, switches, thermocouples, RTD's, thermostats, indicators, meters, proximity probes, indication slide wires, control valves, valve positioners, lock up valves, power cylinders, power cylinder positioners, I/P and E/P converters, air relays, pressure regulators, solenoid valves, analogue indicators, fire detectors, smoke detectors, vibration detectors, gas detectors and fuel valves.

Materials may include lubricants, cleaning solvents, gasket materials, leak test solution, connectors and fittings.

Components may include hair springs, gauge movements, pneumatic restrictors, air relays, microswitches, flapper/nozzles, diaphragms, springs, bellows, gaskets, shuttle valves, pilot valves, amplifier modules, coils and plug in printed circuit boards.

Test and measurement instruments may include dead weight tester, pneumatic calibrator, vacuum pump gauge, manometer, precision pressure gauge, hand-held pressure pump, comparator, temperature baths, oven, multimeter, variable power supply, d.c. I/V standard, potentiometer and decade box.

Fault finding and diagnostic techniques may include linear approach, half split rule, sensory detection, insulation/resistance and continuity tests.

Fault indicators may include indication lamps, LEDs, alarms and flag relays

Fixed wiring tests can refer to polarity, loop impedance and continuity.

Fixed piping and tubing tests can refer to leak and continuity.

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RANGE STATEMENT

Monitoring equipment can refer to test recorder/data logger.

Work may be performed with equipment on-line.

Work completion details may include plant and maintenance records, job cards, check sheets and on device labelling updates.

Work site environment may be affected by nearby plant or processes, e.g. heat, noise, dust, oil, water and chemical.

Isolations can refer to electrical/mechanical or other associated processes.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1.00 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Maintenance

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UEPMNT361A Maintain Wind Turbine Mechanical Systems

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to undertake the maintenance of wind turbine mechanical systems.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

Pre-Requisites

Prerequisite Unit(s) **4)**

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Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no prerequisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and prepare for the work	1.1 Work requirements are identified from request/work orders or equivalent and clarified/confirmed with appropriate parties or by site inspection
	1.2 Occupational Health and Safety standards, statutory requirements, relevant Australian standards, codes of practice, manufacturer specifications, environmental requirements and enterprise procedures are identified, applied and monitored throughout the work procedure.
	1.3 Resources required to satisfy the work plan are identified, obtained and inspected for compliance with the job specifications
	1.4 Relevant plans, drawings and texts are selected and interpreted in accordance with the work plan
	1.5 Correct size, type and quantity of materials/components are determined, obtained and inspected for compliance with the job specifications
	1.6 Work is planned in detail including sequencing and prioritising and considerations made, where appropriate, for the maintenance of plant security and capacity in accordance with system/site requirements
	1.7 Coordination requirements, including requests for isolations where appropriate, are resolved with others involved, affected or required by the work
	1.8 Potential hazards are identified and prevention and/or control measures are selected in accordance with the work plan and site procedures
	1.9 Work area is prepared in accordance with work requirements and site procedures
	1.10 Where appropriate, the teams and individuals

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ELEMENT		PERFORMANCE CRITERIA	
			roles and responsibilities within the team are identified and, where required, assist in the provision of on-the-job training
2	Inspection and testing of wind turbine mechanical systems.	2.1	Required isolations are confirmed where appropriate in accordance with site requirements.
		2.2	System equipment and components are identified and prepared for inspection and testing.
		2.3	Visual inspection and testing are carried out in accordance with manufacturer specifications and site procedures
		2.4	Defects are repaired or reported in accordance with manufacturer specifications and site procedures.
3	Conduct maintenance	3.1	If required equipment is replaced due to faulty operation or maintenance plan requirements in accordance with manufacturer specifications and site procedures
		3.2	If required equipment is dismantled for maintenance in accordance with manufacturer specifications and site procedures.
		3.3	Sketches are made, data noted and components marked for identification and/or re-assembly in accordance with job requirements and site procedures.
		3.4	If required new components are obtained and inspected for compliance with manufacturer specifications.
		3.5	If required equipment is re-assembled applying appropriate principles and techniques in accordance with manufacturer specifications and site requirements.
		3.6	Equipment is tested, monitored and adjusted as required in accordance with manufacturer specifications and site requirements.
4	Complete the work	4.1	Work is completed and appropriate personnel notified in accordance with site/enterprise

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ELEMENT	PERFORMANCE CRITERIA	
		requirements
	4.2	Work area is cleared of waste, cleaned, restored and secured in accordance with site/enterprise procedures
	4.3	Plant, tools and equipment are maintained and stored in accordance with site/enterprise procedures
	4.4	Work completion details are finalised in accordance with site/enterprise procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of wind turbine mechanical systems.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PM361A Wind Turbine Mechanical Systems

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant Environmental, Occupational Health and Safety legislation and regulations
- Technical drawings and manufacturers manuals
- Introduction to and typical arrangements of wind farm power plant
- Relevant plant and equipment, its location and operating parameters
- Equipment and material required to perform the work
- Wind farm principles
- Wind turbine types and characteristics
- Wind turbine blade pitch systems types and characteristics
- Wind turbine yaw system types and characteristics
- Precision measuring equipment
- Seals and gaskets
- Bearings
- Specialised tools and jigs
- Rigging and lifting equipment

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REQUIRED SKILLS AND KNOWLEDGE

- Lubrication systems and oil conditioning systems
- Gearing and power transmission principles
- Hand and portable power tools
- Protective coatings
- Isolation procedures

T2 Specific skills needed to achieve the Performance Criteria:

- Apply Relevant Environmental, Occupational Health and Safety legislation and regulations
- Identify and use precision measuring equipment
- Manufacture and install seals and gaskets
- Install bearings
- Use specialised tools and jigs
- Interpret technical drawings and manufacturers manuals
- Identify and select materials and components
- Apply data analysis techniques and tools
- Use hand and portable power tools
- Apply dismantling and reassembling techniques
- Work to defined tolerances
- Recognise worn/damaged components
- Apply effective maintenance procedures
- Communicate effectively.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the range statement of the competency standard unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment	**9.1)**
	Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best

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utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace; however, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all prerequisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline,

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work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:

- Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
- Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
- Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
- Demonstrate an appropriate level of employability skills
- Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures

- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Plan and prepare for the work
  - Inspection and testing of wind turbine mechanical systems.
  - Conduct preventive maintenance
  - Complete the work
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

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Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and method and in a variety of environments.

Method of assessment

9.4)

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for

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RANGE STATEMENT

different work environments and situations that will affect performance.

A wind turbine mechanical system may include: blade pitch equipment, yaw control equipment, industrial transmissions, generator mechanical equipment, cooling systems, winches, personnel lifts, cranes, ladders and hydraulic equipment.

Maintenance may include: visual inspections, replacement of mechanical components, checking the tension of bolts, replacing bearings, replacing seals and o-rings, condition monitoring, lubrication, testing of equipment for correct operation and lubrication of equipment.

Tools may include micrometers, verniers, dial test indicators, slip gauges, hand tools, hydraulic spanners, customised mandrels, digital height gauges, internal micrometers, depth gauges, air grinders, jigs and fixtures, customised spanners, digital thermometers, oxyacetylene gear and appropriate lifting devices.

Work completion details may include plant and maintenance records, job cards, check sheets, on device labelling updates and reporting and/or documenting equipment defects.

Work site environment may be affected by nearby plant or processes e.g. chemical, heat, dust, noise, height and oil.

Isolations can refer to electrical/mechanical or other associated processes.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1.00 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Maintenance

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UEPMNT362A Maintain Wind Turbine Control Systems

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to undertake maintenance of wind turbine control systems

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit may require an electrical licence to practise in the workplace.

Practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

Pre-Requisites

Prerequisite Unit(s) **4)**

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Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
UEENEEG108A	Trouble-shoot and repair faults in low voltage electrical apparatus and circuits
UEENEEE101A	Apply Occupational Health Safety regulations, codes and practices in the workplace
UEENEEE102A	Fabricate, dismantle, assemble of utilities industry components
UEENEEE104A	Solve problems in d.c. circuits
UEENEEE105A	Fix and secure electrotechnology equipment
UEENEEE107A	Use drawings, diagrams, schedules, standards, cords and specifications
UEENEEG006A	Solve problems in single and three phase low voltage machines
UEENEEG033A	Solve problems in single and three phase low voltage electrical apparatus and circuits
UEENEEG063A	Arrange circuits, control and protection for general electrical installations
UEENEEG101A	Solve problems in electromagnetic devices and related circuits
UEENEEG102A	Solve problems in low voltage a.c.

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Prerequisite Unit(s) **4)**

	circuits
UEENEEG106A	Terminate cables, cords and accessories for low voltage circuits

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA

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ELEMENT	PERFORMANCE CRITERIA	
1 Plan and prepare for the work	1.1	Work requirements are identified from request/work orders or equivalent and clarified/confirmed with appropriate parties or by site inspection
	1.2	Occupational Health and Safety standards, statutory requirements, relevant Australian standards, codes of practice, manufacturers' specifications, environmental requirements and enterprise procedures are identified, applied and monitored throughout the work procedure
	1.3	Resources required to satisfy the work plan are identified, obtained and inspected for compliance with the job specifications
	1.4	Relevant plans, drawings and texts are selected and interpreted in accordance with the work plan
	1.5	Correct size, type and quantity of materials/components are determined, obtained and inspected for compliance with the job specifications
	1.6	Work is planned in detail including sequencing and prioritising and considerations made, where appropriate, for the maintenance of plant security and capacity in accordance with system/site requirements
	1.7	Coordination requirements, including requests for isolations where appropriate, are resolved with others involved, affected or required by the work
	1.8	Potential hazards are identified and prevention and/or control measures are selected in accordance with the work plan and site procedures
	1.9	Work area is prepared in accordance with work requirements and site procedures
	1.10	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training

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ELEMENT	PERFORMANCE CRITERIA	
2 Carry out maintenance	2.1	Required isolations are confirmed where appropriate in accordance with site requirements.
	2.2	Equipment is maintained using appropriate plans, drawings and texts in accordance with the work plan.
	2.3	Equipment is maintained in conjunction with others involved in, or affected by, the work in accordance with the work plan.
	2.4	Calibration and/or adjustments required are carried out to ensure equipment operates within requirements in accordance with the work plan.
	2.5	Maintenance and calibration/adjustments are carried out being aware of trips and alarms of equipment.
	2.6	Final job inspection is carried out and permits relinquished in accordance with the work plan.
3 Complete the work	3.1	Work is completed and appropriate personnel notified in accordance with site/enterprise requirements
	3.2	Work area is cleared of waste, cleaned, restored and secured in accordance with site/enterprise procedures
	3.3	Plant, tools and equipment are maintained and stored in accordance with site/enterprise procedures
	3.4	Work completion details are finalised in accordance with site/enterprise procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired in maintain wind turbine

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REQUIRED SKILLS AND KNOWLEDGE

control systems. The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PM362A Maintain Wind Turbine Control Systems

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant Environmental, Occupational Health and Safety legislation and regulations
- Relevant plant and equipment and its location
- Technical drawings and manufacturers manuals
- Introduction to and typical arrangements of a wind farm power plant
- Relevant state and territory regulations
- Relevant Australian standards;
- Equipment and material required to perform the work
- Isolation procedures
- Maintenance techniques for the equipment
- Wind farm control systems principles and practices
- Electronic principles and applications
- Instrument calibration techniques
- Wind farm control systems equipment
- Generator control systems
- Electrical fundamentals
- Test and measurement of control system equipment
- Engineering and workshop practice

T2 Specific skills needed to achieve the Performance Criteria:

- Apply relevant Environmental, Occupational Health and Safety legislation and regulations
- Interpret technical drawings and manufacturers manuals
- Apply relevant state and territory regulations
- Apply relevant Australian standards
- Apply wind farm control system principles and practices
- Apply electronic principles and applications
- Apply instrument calibration techniques
- Use tools and relevant equipment
- Use test and measurement instruments
- Use correct maintenance procedures
- Identify and select materials for the job
- Apply electrical fundamentals
- Carry out work completion details
- Communicate effectively
- Apply data analysis techniques and tools.

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Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the range statement of the competency standard unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace, however, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be ‘rich’ in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its ‘richness’. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment

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instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all prerequisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Preparation and planning of work
  - Maintenance techniques and procedures
  - Completion of work procedures
  - Dealing with an unplanned event by drawing on essential

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knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and method and in a variety of environments.

Method of assessment

9.4)

This unit shall be assessed by methods given in Section 1.3.00 "Assessment Guidelines".

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

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Concurrent assessment and relationship with other units	**9.5)**
	There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.
	Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Inspection should be planned with the appropriate parties to determine access, conditions and work requirements.

Wind farm control systems may include: generator excitation systems, inverter systems, speed control systems, rectifier systems, blade pitch systems, wind direction sensing systems and yaw control systems.

Wind farm control systems communication systems may include: TCP/IP network, ethernet, fibre optic, wireless, fieldbus, hart protocol, profibus, internet and hard wired.

Wind farm control systems may include one or a combination of: electronic systems, distributive control systems, SCADA, electrical systems, pneumatic systems, hydraulic systems, mechanical systems and PLC systems.

Equipment may include: circuit boards, circuit breakers, transformers, rectifiers, inverters, pressure gauges, electric motors, control cabinets, protection equipment, transmitters, switches, temperature sensors, indicators, meters, proximity probes, fire detectors, smoke detectors and vibration detectors, fibre optic cables, Category 5 cables, wireless transmitters and receivers.

Components may include: fuses, circuit breakers, timers, contactors, contacts, coils, relays, resistors, inductors, capacitors, bridge rectifiers, diodes, heat sinks, solenoids, overloads, plug in printed circuit boards, switches, plugs, cables and thermistors.

Fixed wiring tests can refer to: polarity, loop impedance, insulation resistance and continuity tests.

Materials may refer to: insulation tapes, heat shrink, sleeving, spiral binding, cable ties, solder, lubricants, oil, greases, sealants, lugs, connectors, terminal blocks, cable

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RANGE STATEMENT

markers and identification labels.

Tools, equipment and test and measurement instruments may include: multimeter, decade box, d.c., I/V standard, potentiometer, radiation meter, hand-held communicator, frequency counter, frequency generator, CRO, variac, hand tools, power tools lifting equipment and specialised test equipment.

Fault find and diagnostic techniques may include: linear approach, half split rule, sensory detection/insulation/resistance and continuity test.

Fault indicators may include: self test systems, DCS logs, indication lamps, alarms and flag relays.

Work may be performed in service or out of service.

Work completion details may include: plant and maintenance records, job cards, check sheets and on device labelling updates.

Work site environment may be affected by nearby plant or processes, e.g. heat, noise, dust, oil, water height and chemicals.

Isolations can refer to electrical/mechanical or other associated processes.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1.00 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Maintenance

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UEPMNT366A Maintain power plant inverter systems

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to undertake the maintenance of power plant inverter systems

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit may require an electrical licence to practise in the workplace.

Practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

Pre-Requisites

Prerequisite Unit(s) **4)**

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Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
UEENEEG108A	Trouble-shoot and repair faults in low voltage electrical apparatus and circuits
UEENEEE101A	Apply Occupational Health Safety regulations, codes and practices in the workplace
UEENEEE102A	Fabricate, dismantle, assemble of utilities industry components
UEENEEE104A	Solve problems in d.c. circuits
UEENEEE105A	Fix and secure electrotechnology equipment
UEENEEE107A	Use drawings, diagrams, schedules, standards, cords and specifications
UEENEEG006A	Solve problems in single and three phase low voltage machines
UEENEEG033A	Solve problems in single and three phase low voltage electrical apparatus and circuits
UEENEEG063A	Arrange circuits, control and protection for general electrical installations
UEENEEG101A	Solve problems in electromagnetic devices and related circuits
UEENEEG102A	Solve problems in low voltage a.c.

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Prerequisite Unit(s) **4)**

	circuits
UEENEEG106A	Terminate cables, cords and accessories for low voltage circuits

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT **PERFORMANCE CRITERIA**

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ELEMENT	PERFORMANCE CRITERIA	
1 Plan and prepare for the work	1.1	Work requirements are identified from request/work orders or equivalent and clarified/confirmed with appropriate parties or by site inspection
	1.2	Occupational Health and Safety standards, statutory requirements, relevant Australian standards, codes of practice, manufacturers' specifications, environmental requirements and enterprise procedures are identified, applied and monitored throughout the work procedure
	1.3	Resources required to satisfy the work plan are identified, obtained and inspected for compliance with the job specifications
	1.4	Relevant plans, drawings and texts are selected and interpreted in accordance with the work plan
	1.5	Correct size, type and quantity of materials/components are determined, obtained and inspected for compliance with the job specifications
	1.6	Work is planned in detail including sequencing and prioritising and considerations made, where appropriate, for the maintenance of plant security and capacity in accordance with system/site requirements
	1.7	Coordination requirements, including requests for isolations where appropriate, are resolved with others involved, affected or required by the work
	1.8	Potential hazards are identified and prevention and/or control measures are selected in accordance with the work plan and site procedures
	1.9	Work area is prepared in accordance with work requirements and site procedures
	1.10	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training

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ELEMENT	PERFORMANCE CRITERIA	
2 Carry out maintenance	2.1	Required isolations are confirmed where appropriate in accordance with site requirements
	2.2	System is maintained using appropriate plans, drawings and texts in accordance with the work plan
	2.3	System is maintained in conjunction with others involved in, or affected by, the work in accordance with the work plan
	2.4	Reset and/or adjustments required are carried out to ensure system operates within requirements in accordance with the work plan
	2.5	Maintenance and resets/adjustments are carried out, mindful of effects on, or unnecessary loss of, other equipment
	2.6	Final job inspection is carried out and permits relinquished in accordance with the work plan
3 Complete the work	3.1	Work is completed and appropriate personnel notified in accordance with site/enterprise requirements
	3.2	Work area is cleared of waste, cleaned, restored and secured in accordance with site/enterprise procedures
	3.3	Plant, tools and equipment are maintained and stored in accordance with site/enterprise procedures
	3.4	Work completion details are finalised in accordance with site/enterprise procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired in maintaining electrical

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REQUIRED SKILLS AND KNOWLEDGE

equipment.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PM366A Maintain power plant inverter systems

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant Environmental, Occupational Health and Safety legislation and regulations
- Relevant plant and equipment, its location
- Technical drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Relevant state and territory regulations
- Relevant Australian standards
- Equipment and material required to perform the work
- Isolation procedures
- Maintenance techniques for the system
- Electrical equipment
- Electrical principles
- Test and measurement instruments
- Electrical installation practice
- Engineering and workshop practice

T2 Specific skills needed to achieve the Performance Criteria:

- Apply Relevant Environmental, Occupational Health and Safety legislation and regulations
- Interpret Technical drawings and manufacturers manuals
- Apply relevant state and territory regulations
- Apply relevant Australian standards
- Use tools and equipment
- Use test and measurement instruments
- Use maintenance procedures
- Identify and select materials
- Carry out work completion details
- Apply electrical principles

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and

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EVIDENCE GUIDE

must be read in conjunction with the Performance Criteria and the range statement of the competency standard unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment 9.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace; however, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be ‘rich’ in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its ‘richness’. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects 9.2)

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of evidence required to demonstrate competency in this unit

Before the critical aspects of evidence are considered all prerequisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Preparation and planning of work
  - Installation techniques and procedures
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

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Context of and specific resources for assessment **9.3)**

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and method and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

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There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Inspection should be planned with the appropriate parties to determine access, conditions and work requirements.

System may include a.c. motors, alternators, d.c. motors, generators, inverters, rectifiers, capacitors, low voltage transformers, switchgear, associated control panels, batteries, control/indication and alarm circuits.

Materials may include masonry anchors, bolts, nuts, washers, screws, rivets, saddles, clips, brackets, solvents, adhesives, insulation tapes, heat shrink, sleeving, spiral binding, cable ties, solder, lubricants, oils, greases, sealants, lugs, connectors, terminal blocks, cable markers and identification labels.

Components may include inverters, diodes, transformers, timers, contactors, contacts, coils, relays, resistors, capacitors, solenoids, overloads, switches, plugs, busbar, cable, fans, thermostats, motors, motor bearings, fuses/circuit breakers and earth leakage breakers.

Test and measurement instruments may include tong testers, insulation resistance/continuity tester, multimeters, ductor tester, overload injection tester and growlers.

Work may be performed with equipment on line.

Work completion details may include plant and maintenance records, job cards, check sheets and on device labelling updates.

Work site environment may be affected by nearby plant or processes, e.g. heat, noise, dust, oil, water and chemical.

Isolations can refer to electrical/mechanical or other associated processes.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1.00 Preliminary Information and Glossaries.

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Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Maintenance

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UEPMNT367A Install and commission stationary gas fuelled reciprocating engines

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit covers the installation and commissioning of stationary gas fuelled reciprocating engines for approval where required. It encompasses working safely and to installation standards matching the plant/equipment, location, components and fuel train pipe-work to given specifications. Commissioning the plant and equipment including: pre commissioning tests, start up, adjusting components and controls to safe and efficient operation. Completing all necessary installation and commissioning documentation.

Application of the Unit

Application of the Unit **2)**

General Application **2.1)**

This competency standard unit is suitable for employment-based programs under an approved contract of training at the AQF level of the qualification in which the unit is first packaged or higher.

The unit may be selected as an elective (see qualification packaging rules) provided that all prerequisite units are undertaken or addressed through recognition processes.

This unit may be included in a skill set.

Importation **2.2)**

RTOs wishing to import this unit into any qualification under the flexibility provisions of NQC/NSSC Training

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Package Policy should ensure all pre-requiste units are also imported into the relevant Training Package and qualification.

Licensing/Regulatory Information

License to practice **3)**

During Training: Competency development activities are subject to regulations directly related to licensing, occupational health and safety and where applicable contracts of training such as apprenticeships.

In the workplace: The application of the skills and knowledge described in this unit in some States/Territories requires an authority to practice in the workplace. Other conditions may apply under State and Territory legislative and regulatory requirements.

Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
UEENEEE101A	Apply Occupational Health and Safety regulations, codes and practices in the workplace
CPCCOHS1001A	Work safely in the construction industry
HLTCPR201A	Perform CPR

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Literacy and numeracy skills	**4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading	4	Writing	4	Numeracy	4

Employability Skills Information

Employability Skills	**5)**

This unit contains Employability Skills

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT		PERFORMANCE CRITERIA	
1	Prepare to install and commission stationary gas fuelled reciprocating engine	1.1	OHS procedures for a given work area are identified, obtained and understood.
		1.2	Health and safety risks are identified and

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ELEMENT	PERFORMANCE CRITERIA
	established risk control measures and procedures in preparation for the work are followed.
	1.3 Safety hazards that have not previously been identified are noted and established risk control measures are implemented.
	1.4 Design specification for gas fuelled reciprocating engines to be installed and commissioned is accessed, analysed, interpreted and confirmed through a detailed site inspection.
	1.5 Design specification matters requiring clarification are resolved through liaison with designer and gas authorities.
	1.6 Formal authority to proceed with installation and commissioning is obtained before commencing work, in accordance with regulatory and code of practice requirements.
	1.7 Installation is prepared in consultation with others affected by the work and sequenced appropriately in line with quality assurance requirements.
	1.8 The nature and location of the work is determined from documentation or appropriate person to establish the scope of work to be undertaken.
	1.9 Plant, equipment and component specifications and manufacturer manuals are obtained for planned work activity.
	1.10 Locations of plant, equipment, fuel train pipe-work and components are planned within the constraints of work site, significants and requirements.
	1.11 Materials needed for the installation work are obtained in accordance with design specification and established procedures
	1.12 Tools, equipment, including personal protective equipment, and testing devices needed to for the installation and commissioning work are obtained in accordance with established procedures and checked for correct operation and safety.

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ELEMENT	PERFORMANCE CRITERIA	
	1.13	Work area is prepared to support efficient installation and commissioning of the plant and equipment.
	1.14	Preparatory work is checked to ensure no damage has occurred and complies with requirements.
2 Install stationary gas fuelled reciprocating engine	2.1	OHS risk control measures and procedures for carrying out the work are followed.
	2.2	Regulatory and code of practice recording and reporting requirements are satisfied at appropriate times throughout the work sequence.
	2.3	Gas and electrical circuits/machines/plant are checked as being isolated where necessary in strict accordance OHS requirements and procedures.
	2.4	Stationary gas fuelled reciprocating engine components, including fuel train and associated pipe-work and flue/exhaust systems are installed in accordance with approved design specification and comply with technical standards and regulatory requirements, with sufficient access to affect terminations, adjustment and maintenance.
	2.5	Ventilation systems are installed in accordance with approved design specifications
	2.6	Electrical components, wiring enclosures and wiring, including terminations are installed in accordance with design and manufacturer's specifications, and functional and regulatory requirements.
	2.7	Ongoing compliance and safety inspections of the installed reciprocating engine , equipment, pipe-work, components and accessories are undertaken and defects are rectified
	2.8	Installation is carried out efficiently without unnecessary waste of materials or damage to plant, equipment, pipe-work, components, accessories, the surrounding environment or services and using sustainable energy principles.
	2.9	Unexpected situations are dealt with safely and

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ELEMENT	PERFORMANCE CRITERIA	
		with the approval of an authorised person.
3 Commission stationary gas fuelled reciprocating engine	3.1	OHS risk control measures and procedures for carrying out the work are followed.
	3.2	Regulatory and code of practice recording and reporting requirements are satisfied at appropriate times throughout the work sequence.
	3.3	Gas and electrical safety checks and isolation procedures, including purging are completed and recorded to manufacturer and other authority requirements before testing and commissioning are commenced.
	3.4	Operational parameters of individual components are tested and adjusted to conform to specifications
	3.5	The reciprocating engine operations are tested first without and then with fuel, adjustments are completed as necessary and results recorded in accordance with approving authority requirements.
	3.6	Exhaust gases are analysed in accordance with recognised industry practice and other authority requirements.
	3.7	Unexpected situations are dealt with safely and with the approval of an authorised person
	3.8	Commissioning is conducted efficiently without waste of materials or damage to apparatus and the surrounding environment or services and using sustainable energy practices
4 Completion and report installation and commissioning activities.	4.1	OHS work completion risk control measures and procedures are followed.
	4.2	Final check of the installed reciprocating engine is made to verify that it complies with all requirements, including any certification required by local authorities.
	4.3	Work area is cleared and materials disposed of or recycled in accordance with federal, state and territory legislation and workplace procedures.

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ELEMENT	PERFORMANCE CRITERIA
	4.4 Tools and equipment are cleaned, checked, serviced and stored in accordance with manufacturer recommendations and workplace procedures
	4.5 Work site is cleaned and made safe in accordance with established procedures.
	4.6 'As-installed' reciprocating engine equipment components, pipe-work, flue/exhaust systems and accessories are documented, accessed and an appropriate person or persons notified in accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of safe working practices and installing and commissioning of gas fuelled reciprocating engine

All knowledge and skills detailed in this unit should be contextualised to current industry standards, technologies and practices

The extent of the essential knowledge and associated skills (EKAS) required is given below. It forms an integral part of this unit.

KS01-PM367A Installation and commissioning of gas fuelled plant and equipment

Evidence shall show an understanding of installation and commissioning techniques for stationary gas fuelled reciprocating engines, applying safe working practices and relevant Standards, Codes and Regulations to an extent indicated by the following aspects:

T1. Gas fuels encompassing:

- Types, properties and applications
- Safety
- Hazards
- Combustion
- Ignition types

T2. Gas fuelled reciprocating engine overview encompassing:

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REQUIRED SKILLS AND KNOWLEDGE

- Types
- Major components
- Operating principles
- Manufacturer's specifications and diagrams

T3. Fuel train requirements encompassing:

- Pipe-work and connections
- Valves
- Metering devices
- Regulating valves
- Electrical controls

T4. Exhaust/flue requirements encompassing:

- Materials
- Terminations
- Sizing

T5. Location ventilation requirements encompassing:

- Materials
- Calculations
- Interlocks
- Locations

T6. Hazardous area requirements encompassing:

- Locations
- Housing requirements
- Distances

T7. Codes, regulations and standards encompassing:

- AS 3814
- AS 5601

T8. Design specifications encompassing:

- Accessing
- Analysis and interpretation
- Calculations

T9. Required authority to proceed encompassing:

- Regulatory requirements (Scope and restrictions)
- Standards and code of practice requirements.
- Required documentation and submissions

T10. Site Arrangements encompassing:

- Location and environment

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REQUIRED SKILLS AND KNOWLEDGE

- Piping requirements for gas fuel train pipe-work
- Suitable equipment/equipment plant locations

T11. Site Safety encompassing:

- Hazards
- Checklists
- Reports

T12. Plant/equipment diagrams encompassing:

- Mechanical layouts
- Gas pipe-work drawings
- Electrical circuits

T13. Installation encompassing:

- Reciprocating engines plant and equipment
- Gas train pipe-work and components
- Exhaust/flue system
- Ventilation system
- Pressure testing and purging
- Authorisations and certification requirements and procedures

T14. Commissioning encompassing:

- Inspection of the installed reciprocating engines, pipe-work, components and accessories
- Testing reciprocating engine operation first without and then with fuel
- Testing and adjusting regulator, operation and safety controls
- Exhaust gases analysis throughout operating parameters including bifuel applications
- Compliance with design specification, regulations, codes, standards and manufacturers specifications
- Documentation and reports
    - As-installed' reciprocating engine components, pipe-work, flue/exhaust systems and accessories are documented and reported

Evidence Guide

EVIDENCE GUIDE

9) The evidence guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

The Evidence Guide forms an integral part of this unit. It must be used in conjunction

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EVIDENCE GUIDE

with all parts of this unit and performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accordance with industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Sources of evidence need to be 'rich' in nature to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate **9.2)**

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competency in this unit

Before the critical aspects of evidence are considered all prerequisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated performance criteria shall be demonstrated on at least two occasions in accordance with the 'Assessment Guidelines – UEP12'. Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the performance criteria and range statement
  - Apply sustainable energy principles and practices as specified in the performance criteria and range statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in this unit. It may be required by some jurisdictions that RTOs provide a percentile graded result for the purpose of regulatory or licensing requirements.
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti-Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated consistent performance across a representative range of contexts from the prescribed items below:
  - Install and commission gas fuelled plant and equipment as described as described in 8) and including:

    A Obtaining formal authority to proceed with installation and commissioning before commencing work, in accordance with regulatory and code of practice requirements.

    B Reading and interpreting drawings related to plant/equipment locations and pipe-work connections

    C Installing, securing, aligning and connecting plant, equipment, pipe-work, components and

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accessories accurately in their planned location and in compliance with codes and standards.

D Undertaking on-going compliance and safety inspections

E Rectifying any defects revealed through on-going inspections

F Pressure testing, repairing leaks and purging the fuel train system entire system to the appropriate design test pressures.

G Commissioning plant and equipment operation as necessary and results recorded in accordance with approving authority requirements

H Correctly documenting 'as-installed' plant, equipment, pipe-work, components and accessories

I Dealing with unplanned events

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

These should be part of the formal learning/assessment environment.

Note:

Where simulation is considered a suitable strategy for assessment, conditions must be authentic and as far as possible reproduce and replicate the workplace and be consistent with the approved industry simulation policy.

The resources used for assessment should reflect current industry practices in relation to installing low voltage electrical apparatus and associated equipment.

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Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the industry to which this unit applies. This requires assessment in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

There are no concurrent assessment recommendations for this unit.

The critical aspects of occupational health and safety covered in either UEENEEE101A or CPCCOHS1001A and HLTCPR201A and other discipline specific occupational health and safety units shall be incorporated in relation to this unit.

Range Statement

RANGE STATEMENT

10) This relates to the unit as a whole providing the range of contexts and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

This unit shall be demonstrated in relation to installation and commissioning of stationary gas fuelled reciprocating engines as follows:

Each of the following:

- Installing and connecting gas fuel train pipe-work, regulators, valves, metering and protective devices from gas pipeline to the reciprocating engine.
- Installing and connecting flue/exhaust system
- Pressure testing and purging gas fuel train
- Commissioning gas fuelled reciprocating engine, adjusting components and

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RANGE STATEMENT

controls to safe and efficient operation.

The gas fuel can be from gas gathering lines, gas transmission pipelines, distribution pipeline, and consumer gas installations. Gas Fuels can be natural gas, LPG, SNG, bio-gas, waste gas or sewage gas, used as a single gas fuel or part of a duel fuel system.

Generic terms used throughout this Vocational Standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms that apply are given in Section 2.1.00 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Maintenance

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UEPMNT368A Repair and maintain stationary gas fuelled reciprocating engines

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit covers the isolation, disconnecting, repairing, reconnecting and maintenance of stationary gas fuelled reciprocating engines for approval where required. It encompasses working safely and to relevant standards disconnecting, carry out repairs and replacement of fuel train components to given specifications. Reconnecting the engine including: pre start tests, start up, adjusting components and controls to safe and efficient operation. Completing all required documentation.

Application of the Unit

Application of the Unit **2)**

General Application **2.1)**

This competency standard unit is suitable for employment-based programs under an approved contract of training at the AQF level of the qualification in which the unit is first packaged or higher.

The unit may be selected as an elective unit (see qualification packaging rules) provided that all prerequisite units are undertaken or addressed through recognition processes.

This unit may be included in a skill set.

Importation **2.2)**

RTOs wishing to import this unit into any qualification under the flexibility provisions of NQC/NSSC Training

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Package Policy should ensure all pre-requiste units are also imported into the relevant Training Package and qualification.

Licensing/Regulatory Information

License to practice **3)**

During Training: Competency development activities are subject to regulations directly related to licensing, occupational health and safety and where applicable contracts of training such as apprenticeships.

In the workplace: The application of the skills and knowledge described in this unit in some States/Territories requires an authority to practice in the workplace. Other conditions may apply under State and Territory legislative and regulatory requirements.

Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
UEENEEE101A	Apply Occupational Health and Safety regulations, codes and practices in the workplace
CPCCOHS1001A	Work safely in the construction industry
HLTCPR201A	Perform CPR

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Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 4 Writing 4 Numeracy 4

Employability Skills Information

Employability Skills **5)**

This unit contains Employability Skills

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare to repair and maintain gas fuelled reciprocating engines	1.1 OHS procedures for a given work area are identified, obtained and understood.
	1.2 Health and safety risks are identified and established risk control measures and procedures

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ELEMENT	PERFORMANCE CRITERIA	
		in preparation for the work are followed.
	1.3	Safety hazards that have not previously been identified are noted and established risk control measures are implemented.
	1.4	Formal authority to proceed with repair and maintenance is obtained before commencing work, in accordance with regulatory and code of practice requirements
	1.5	Repair and maintenance is prepared in consultation with others affected by the work and sequenced appropriately.
	1.5	The nature and location of the work is determined from documentation or appropriate person to establish the scope of work to be undertaken.
	1.6	Plant, equipment and component specifications and manufacturer manuals are obtained for planned work activity
	1.7	Material needed for the repair and maintenance work is obtained in accordance with established procedures and checked against job requirements.
	1.8	Tools, equipment, including personal protective equipment, and testing devices needed to for the repair and maintenance work are obtained in accordance with established procedures and checked for correct operation and safety.
	1.9	Preparatory work is checked to ensure no damage has occurred and complies with requirements.
2 Repair and maintain gas fuelled reciprocating engines	2.1	OHS risk control measures and procedures for carrying out the work are followed.
	2.2	Regulatory and code of practice recording and reporting requirements are satisfied at appropriate times throughout the work sequence.
	2.3	Gas and electrical circuits/machines/plant are checked and recorded as being isolated and safe where necessary in strict accordance authority and OHS requirements and procedures before

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ELEMENT	PERFORMANCE CRITERIA	
		work is commenced.
	2.4	Nature and possible cause of faults or out of specification performance are identified from defect reports or operational records.
	2.5	Fault finding is approached methodically drawing on knowledge of gas fuelled reciprocating engines using observation, measurement, calculations and comparison with normal system and component parameters/values.
	2.6	Faults beyond the scope of gas fuel train, ignition or fume exhaust work are identified and arrangements are made for appropriately competent and authorised person to rectify faults
	2.7	Engine is disconnected where necessary to carry out maintenance and repairs in strict accordance authority and OHS requirements and procedures. Note: No modifications are permitted.
	2.8	Components are removed/dismantled where necessary and parts stored to protect them against loss or damage
	2.9	Faulty components are rechecked and their fault status confirmed.
	2.10	Materials required to rectify faults are sourced and obtained in accordance with established procedures
	2.11	Repair and maintenance work is carried out efficiently without unnecessary waste of materials or damage to apparatus, circuits, the surrounding environment or services and using sustainable energy principles.
	2.12	Effectiveness of the repair is tested in accordance with established procedures.
	2.13	System is reassembled, reconnected and finally tested to ensure it is operating safely, effectively and complies with relevant requirements.
	2.14	Unexpected situations are dealt with safely and

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ELEMENT	PERFORMANCE CRITERIA	
		with the approval of an authorised person.
3 Completion and report repair and maintenance	3.1	OHS work completion risk control measures and procedures are followed.
	3.2	Final check of the engine is made to verify that it complies with all requirements, including any certification requirements by local authorities.
	3.3	Work area is cleared and materials disposed of or recycled in accordance with federal, state and territory legislation and workplace procedures.
	3.4	Tools and equipment are cleaned, checked, serviced and stored in accordance with manufacturer recommendations and workplace procedures
	3.5	Work site is cleaned and made safe in accordance with established procedures.
	3.6	Maintenance and repair work is documented and an appropriate person or persons notified in accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of safe working practices and repairing and maintaining gas fuelled reciprocating engines.

All knowledge and skills detailed in this unit should be contextualised to current industry standards, technologies and practices.

The extent of the essential knowledge and associated skills (EKAS) required is given below. It forms an integral part of this unit.

KS01-PM368A Repairing and maintaining gas fuelled reciprocating engines

Evidence shall show an understanding of repairing and maintaining stationary gas fuelled reciprocating engines, applying safe working practices and relevant Standards, Codes and Regulations to an extent indicated by the following aspects:

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REQUIRED SKILLS AND KNOWLEDGE

T1. Gas fuels encompassing:

- Types, properties and applications
- Safety
- Hazards
- Combustion
- Ignition types

T2. Gas fuelled reciprocating engines encompassing:

- Types
- Major components
- Operating principles
- Manufacturer’s specifications and diagrams

T3. Fuel train requirements encompassing:

- Pipe-work and connections
- Valves
- Metering devices
- Regulating valves
- Electrical controls

T4. Exhaust/flue requirements encompassing:

- Materials
- Terminations
- Sizing

T5. Location’s ventilation requirements encompassing:

- Locations
- Materials
- Calculations
- Interlocks

T6. Hazardous area requirements encompassing:

- Locations
- Housing requirements
- Distances

T7. Codes, regulations and standards encompassing:

- AS 3814
- AS 5601

T8. Design specifications encompassing:

- Accessing
- Analysis and interpretation
- Calculations

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REQUIRED SKILLS AND KNOWLEDGE

T9. Required authority to proceed encompassing:

- Regulatory requirements (Scope and restrictions)
- Standards and code of practice requirements.
- Required documentation and submissions

T10. Site Arrangements encompassing:

- Location and environment
- Piping requirements for gas fuel train pipe-work
- Suitable equipment/equipment plant locations

T11. Site Safety encompassing:

- Hazards
- Checklists
- Reports

T12. Engine diagrams encompassing:

- Mechanical layouts
- Gas pipe-work drawings
- Electrical circuits

T13. Fault finding encompassing:

- Taking readings and gathering information
- Symptoms and possible faults
- Logical fault diagnosis sequence and flow charts
- Manufacturer’s fault diagnosis tables
- Confirming actual fault

T14. Disconnect requirements and procedures encompassing:

- Regulator, business and customer requirements
- Manufacturers specifications and procedures

T15. Repairs and maintenance requirements and procedures encompassing:

- Gas train pipe-work and components
- Exhaust/flue system
- Ventilation system
- Oil change
- Oil and air filter replacement

T16. Reconnection requirements and procedures encompassing:

- Regulator, business and customer requirements
- Manufacturers specifications and procedures
- Inspection of the installed engine, pipe-work, components and accessories
- Pressure testing and purging

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REQUIRED SKILLS AND KNOWLEDGE

- Testing engine operation first without and then with fuel
- Testing and adjusting regulator, operation and safety controls
- Exhaust gases analysis.
- Compliance with design specification, regulations, codes, standards and manufacturers specifications back to Commissioned settings
- Documentation and reports
  - As-installed' plant and equipment components, pipe-work, flue/exhaust systems and accessories are documented and reported

Evidence Guide

EVIDENCE GUIDE

9) The evidence guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

The Evidence Guide forms an integral part of this unit. It must be used in conjunction with all parts of this unit and performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accordance with industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being

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assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Sources of evidence need to be 'rich' in nature to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all prerequisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated performance criteria shall be demonstrated on at least two occasions in accordance with the 'Assessment Guidelines – UEP12'. Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the performance criteria and range statement
  - Apply sustainable energy principles and practices as specified in the performance criteria and range statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in this unit. It may be required by some jurisdictions that RTOs provide a percentile graded result for the purpose of regulatory or licensing requirements.

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- Demonstrate an appropriate level of employability skills
- Conduct work observing the relevant Anti-Discrimination legislation, regulations, polices and workplace procedures

- Demonstrated consistent performance across a representative range of contexts from the prescribed items below:
  - Repairing and maintaining gas fuelled reciprocating engines as described as described in 8) and including:

    A Conducting maintenance

    B Finding faults efficiently

    C Disconnecting engine

    D Rectifying faults without damage

    E Reconnecting

    F Providing written reports on work undertaken

    G Dealing with unplanned events

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

These should be part of the formal learning/assessment environment.

Note:

Where simulation is considered a suitable strategy for assessment, conditions must be authentic and as far as possible reproduce and replicate the workplace and be consistent with the approved industry simulation policy.

The resources used for assessment should reflect current industry practices in relation to installing low voltage electrical apparatus and associated equipment.

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Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the industry to which this unit applies. This requires assessment in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

There are no concurrent assessment recommendations for this unit.

The critical aspects of occupational health and safety covered in either UEENEEE101A or CPCCOHS1001A and HLTCPR201A and other discipline specific occupational health and safety units shall be incorporated in relation to this unit.

Range Statement

ANGE STATEMENT

10) This relates to the unit as a whole providing the range of contexts and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

This unit shall be demonstrated in relation to repairing and maintaining stationary gas fuelled reciprocating engines as follows:

Each of the following:

- Gas fuel train pipe-work, regulators, valves, metering and protective devices from gas pipeline to the engine.
- Flue/exhaust system
- Pressure testing and purging gas fuel train
- Disconnecting and reconnecting gas fuelled reciprocating engines, adjusting components and controls to safe and efficient operation.

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ANGE STATEMENT

It does not include the following:

- Repairs the internal mechanical components of the engine

The gas fuel can be from gas gathering lines, gas transmission pipelines, distribution pipeline, and consumer gas installations. Gas Fuels can be natural gas, LPG, SNG, bio-gas, waste gas or sewage gas, used as a single gas fuel or part of a duel fuel system.

Generic terms used throughout this Vocational Standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms that apply are given in Section 2.1.00 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Maintenance

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UEPMNT369A Monitor climatic conditions for renewable electricity generation

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to monitor weather and climate conditions for purposes of planning electricity generation from renewable sources and ensuring safety of plant and personnel.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must have been completed.

Unit Code	Unit Title
UEENEEE101A	Apply Occupational Health and Safety regulations, codes and practices in the workplace

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading	3	Writing	3	Numeracy	3

Employability Skills Information

Employability Skills **5)**

This unit contains Employability Skills.

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

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Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Interpret weather and climate information	1.1 Weather and climate information and warnings are regularly monitored to determine likely conditions.
	1.2 Potential variations in weather and climate conditions are anticipated and assessed according to warnings, weather patterns and historical experience.
	1.3 Possible impacts of weather and climate on plant, equipment, grid demand, and civil assets are identified.
2 Plan for adverse or extreme weather conditions	2.1 Enterprise operational guidelines and Employee Enterprise Agreements for adverse weather conditions are accessed.
	2.2 Possible outages and actions to be taken are discussed with key stakeholders and customers
3 Take action in response to adverse or extreme weather conditions	3.1 Work schedules are adjusted to take account of planning for extreme weather events.
	3.2 Workplace actions and required procedures to be followed during and after extreme weather event are analysed and discussed with other site personnel and team members
	3.3 External assets in the perimeter area of the wind turbine generator are prepared for extreme weather event(s).
	3.4 Emergency and evacuation procedures are executed as a result of the expected adverse

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ELEMENT	PERFORMANCE CRITERIA	
		weather conditions
	3.4	Stakeholders and key personnel are informed of the anticipated impacts of weather and climate on plant, equipment, grid demand and civil assets.
	3.5	Meteorological incidents and rates during extreme weather events are monitored and required preventative action taken.
	3.6	Normal operations are only recommenced after confirmation of return to normal weather conditions.
4 Complete documentation	4.1	Enterprise documentation is updated in accordance with enterprise/site procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

KS01-PM369A Monitor climatic conditions for renewable energy production

Evidence shall show that knowledge has been acquired of monitoring and maintaining wind farm civil assets to the extent indicated by the following aspects:

T1. Basic knowledge of meteorology

- Lightning and storms
- Wind speed and direction
- Atmospheric pressure

T2. Sources of meteorological information

- Bureau of meteorology
- On-site weather measuring technology
- Proprietary sources of meteorological data

T3. Weather safety alert systems

- SMS alerts

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REQUIRED SKILLS AND KNOWLEDGE

- Internet alerts

T4. Enterprise documentation and procedures relating to operations and management of renewable electricity generation plant and equipment during extreme weather events

T5. Lightning protection systems

- Generator protection
- Lightning rods and conductors

T6. Post-weather event damage inspections

T7. National energy market pricing

Evidence Guide

EVIDENCE GUIDE

9) The Evidence Guide forms an integral part of this Unit and shall be used in conjunction with all components parts of this unit and performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the industry-preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accordance with industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

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The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Sources of evidence need to be 'rich' in nature to minimise error in judgment.

Activities associated with normal everyday work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines, Section 3.1 of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated:

- On at least two (2) occasions. In accordance with the "Assessment Guidelines" for the UEP12 Training Package.

Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and range; and
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and range; and
  - Demonstrate an understanding of the required skills and knowledge as described in this unit to such an extent that the learner's performance outcome is reported in accordance with the preferred approach; namely a percentile graded result, where required by the regulated environment; and
  - Demonstrate an appropriate level of employability skills;

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and

- Conduct work observing the relevant Anti Discrimination legislation, regulations, policies and workplace procedures; and

Demonstrated performance across a representative range of contexts from the prescribed items below:

A	All of the following	• Access Bureau of Meteorology data • Access local weather data from on-site monitoring systems
B	All of the following	• Wind speed • Wind direction • Atmospheric pressure • Lightning strike geographical data
C	All of the following	• Enterprise documentation regarding dealing with adverse weather effects
D	All of the following	• Deal with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

These should be used in the formal learning/assessment environment.

Note:

Where simulation is considered a suitable strategy for assessment, conditions must be authentic and as far as possible reproduce and replicate the workplace and be consistent with the approved industry simulation policy.

The resources used for assessment should reflect current industry practices in relation to:

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Monitor climatic conditions for renewable electricity generation

Method of assessment

9.4)

This unit shall be assessed by methods given in the Assessment Guidelines, Section 1.3 of this Training Package.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this competency standard unit applies. This requires assessment in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

For optimisation of training and assessment effort, competency development in this unit may be arranged concurrently with unit:

UEPMNT446 Coordinate maintenance on a wind farm A

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Adverse weather conditions include:

- High wind
- Lightning events
- Extreme hot or cold
- High precipitation
- Cyclonic events

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RANGE STATEMENT

Meteorological data includes:

- Wind speed
- Atmospheric pressure
- Precipitation (rain, hail or snow)
- Lightning strikes
- Weather forecasts

Documentation includes:

- Enterprise procedures applicable to extreme weather events
- Employee industrial agreements
- Wind farm management plans
- Emergency evacuation procedures applicable to extreme weather events

Safety alerts and warnings

Generic terms used throughout this Vocational Standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms that apply are given in the Glossaries, Section 2.1 of this Training Package.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Maintenance

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UEPMNT370A Maintain and monitor wind farm civil assets

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to condition monitor and conduct preventative, remedial maintenance required to ensure the integrity of civil assets associated within a wind farm.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must have been completed.

Common Unit Group

Unit Code	Unit Title
UEENEEE101A	Apply Occupational Health Safety regulations, codes and practices in the workplace
UEENEEK142A	Apply environmental and sustainable procedures in the energy sector
UEENEEE102A	Fabricate, assemble and dismantle utilities industry components

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

This unit contains Employability Skills.

The required outcomes described in this unit of competency contain applicable facets of Employability

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Employability Skills	**5)** Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and prepare for the work	1.1 Occupational Health and Safety standards, statutory requirements, relevant Australian standards, codes of practice, manufacturer specifications, environmental requirements and enterprise procedures are identified, applied and monitored throughout the work procedure.
	1.2 Work requirements are identified from request/works orders or equivalent and clarified/confirmed with appropriate parties or by site inspection.
	1.3 Resources required to satisfy the work are identified, obtained and inspected for compliance in accordance with enterprise procedures.
	1.4 Potential hazards are identified and prevention and/or control measures are selected in accordance with the work plan and site procedures.
	1.5 Work is planned in detail including sequencing and prioritising and considerations made, where appropriate, for maintenance of plant security and capacity in accordance with site

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ELEMENT	PERFORMANCE CRITERIA	
		requirements.
	1.6	Co-ordination requirements, including requests for isolations where appropriate, are resolved with others involved, affected or required by the work.
2 Monitor civil assets	2.1	Inspections of assets are completed in accordance with enterprise/site requirements.
	2.2	Inspections are reported in accordance with enterprise/site requirements.
	2.3	Defects are repaired or reported in accordance with enterprise/site requirements.
3 Maintain civil assets	3.1	Maintenance of civil assets is undertaken in accordance with site requirements and local conditions.
	3.2	Appropriate tools, equipment or plant required to maintain assets is utilised in accordance with manufacturers specifications and job requirements.
	3.3	Defects are repaired or reported in accordance with enterprise/site requirements.
4 Complete the work	4.1	Work is completed and appropriate personnel notified in accordance with enterprise/site requirements.
	4.2	Work area is cleared of waste, cleaned, restored and secured in accordance with enterprise/site requirements.
	4.3	Tools and equipment are maintained in accordance with manufacturer specifications and enterprise/site procedures.
	4.4	Work completion details are finalised in accordance with enterprise/site procedures.
	4.5	Lessons learnt from the activity or experience are shared with other team members and recorded for future reference.

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

KS01-PM370 Maintain and Monitor wind farm civil assets
A

Evidence shall show that knowledge has been acquired of monitoring and maintaining wind farm civil assets to the extent indicated by the following aspects:

T1. Fencing

- Types and applicability of different types of fencing
- Regulations for types of fencing and installation standards
- Methods for maintaining fencing

T2. Gates

- Types and applicability of different types of gates
- Methods for maintaining gates

T3. Paints

- Types and uses of different types of paint
- Health and safety precautions with use of different types of paints
- Disposal of paint

T4. Corrosion

- Recognising corrosion
- Typical places where corrosion occurs
- Methods of corrosion control

T5. Pests

- Identification of different types of pests and the damage they cause
  - Insect pests
  - Rodents
  - Native animals
  - Permitted and recommended methods of pest control

T6. Vegetation control

- Identification of types of weeds
- Native plants including protected species

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REQUIRED SKILLS AND KNOWLEDGE

- Methods of controlling weeds and vegetation
- Mechanical vegetation control
  - Lawn mowers
  - Brush cutters
  - Chain saws

T7. Security

- Methods of securing site assets
- 1st-level maintenance of security systems

T8. Emergency services

T9. Enterprise procedures for notifying emergency services in case of an incident

T10. Roads and pathways

- Materials used to build roads and pathways
- Recognising early signs of deterioration
- Restorative techniques
- Blue-metal rock mulch maintenance

T11. Erosion control

- Causes of soil erosion
- Stormwater control

T12. Lighting

- Types of luminaires
- Method of replacing different types of luminaires
- Method of isolating lighting circuits prior to servicing

T13. Planning permit and environmental plans

- Identification of planning and environmental plan restrictions
- Methods of civil works remediation that conform both to planning and environmental plans

Evidence Guide

EVIDENCE GUIDE

9) The Evidence Guide forms an integral part of this Unit and shall be used in conjunction with all components parts of this unit and performed in accordance with the Assessment Guidelines of this Training Package.

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Overview of Assessment **9.1)**

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the industry-preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accordance with industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Sources of evidence need to be ‘rich’ in nature to minimise error in judgment.

Activities associated with normal everyday work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its ‘richness’. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines, Section 3.1 of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit **9.2)**

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria

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shall be demonstrated:

- On at least two (2) occasions. accordance with the "Assessment Guidelines" for the UEP12 Training Package.

Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframe typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and range; and
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and range; and
  - Demonstrate an understanding of the required skills and knowledge as described in this unit to such an extent that the learner's performance outcome is reported in accordance with the preferred approach; namely a percentile graded result, where required by the regulated environment; and
  - Demonstrate an appropriate level of employability skills; and
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, policies and workplace procedures; and

Demonstrated performance across a representative range of contexts from the prescribed items below:

A	All of the following	• Repair a mesh wire fence
B	All of the following	• Repair a gate hinge
C	All of the following	• Perform corrosion restoration and painting of a metal surface
D	All of the following	• Place pest control baits in a safe and environmentally aware manner
E	All of the following	• Use a brush cutter to reduce vegetation from the perimeter of a building or structure • Use a lawnmower to reduce vegetation from the perimeter of a building or structure

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F	All of the following	• Perform a survey of the serviceability of lighting systems and replace defective lamps
G	All of the following	• Confirm the correct operation of security systems
H	All of the following	• Deal with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

These should be used in the formal learning/assessment environment.

Note:

Where simulation is considered a suitable strategy for assessment, conditions must be authentic and as far as possible reproduce and replicate the workplace and be consistent with the approved industry simulation policy.

The resources used for assessment should reflect current industry practices in relation to:

Maintain and monitor wind farm assets

Method of assessment

9.4)

This unit shall be assessed by methods given in the Assessment Guidelines, Section 1.3 of this Training Package.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this competency standard unit

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applies. This requires assessment in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no concurrent assessment recommendations for this unit.

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Civil assets may include: buildings, roads, fences, wind monitoring tower, lighting towers, transmission line structures, walkways and poles.

Maintain civil assets may include: repairs to buildings, maintenance of buildings, maintenance of roads, repairs to fences, repairs to towers, weed control, inspection of poles, maintenance of tourist locations and repairs to walkways.

Safety standards may include relevant sections of Occupational Health and Safety legislation, enterprise safety rules, relevant state and federal legislation, local by-laws, environmental requirements, relevant licensing requirements for tools and mobile plant.

Communications may be by means of telephone, fax, two-way radio, dedicated computer equipment, logs, and verbal.

Appropriate personnel to consult, give or receive direction may include power plant operator/system controllers, technical and engineering officers, maintenance staff, other authorities, contractors and general public.

Tools and equipment may include lifting equipment, cranes, hoists, mobile plant, four wheel drive vehicles, earth moving equipment, trash rakes, power tools, chainsaws, boats, hand tools and fire suppression equipment.

Extreme and varied weather conditions which may be encountered, include rain, high winds and flooding.

Work completion details may include enterprise recording procedures (electronic or

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RANGE STATEMENT

hard copy).

Generic terms used throughout this Vocational Standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms that apply are given in the Glossaries, Section 2.1 of this Training Package.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Maintenance

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UEPMNT371A Maintain large scale wind turbine generators

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to undertake the scheduled maintenance of large scale wind turbine generators (WTGs).

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

Pre-Requisites

Prerequisite Unit(s) **4)**

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Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must have been completed.

Unit Code	Unit Title
UEENEEE101A	Apply Occupational Health and Safety regulations, codes and practices in the workplace

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

This unit contains Employability Skills.

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

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Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Plan and prepare for the work	1.1	Work requirements are identified from request/work orders or equivalent and clarified/confirmed with appropriate parties or by site inspection
	1.2	Occupational Health and Safety standards, statutory requirements, relevant Australian standards, codes of practice, manufacturer specifications, environmental requirements and enterprise procedures are identified, applied and monitored throughout the work procedure.
	1.3	Resources required to satisfy the work plan are identified, obtained and inspected for compliance with the job specifications
	1.4	Relevant plans, drawings and texts are selected and interpreted in accordance with the work plan
	1.5	Work is planned in detail including sequencing and prioritising and considerations made, where appropriate, for the maintenance of plant security and capacity in accordance with system/site requirements
	1.6	Coordination requirements, including requests for isolations where appropriate, are resolved with others involved, affected or required by the work
	1.7	Work area is prepared in accordance with work requirements and site procedures
	1.8	Appropriate teams and individuals roles and responsibilities within the team are identified and, where required, used to assist in the

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ELEMENT	PERFORMANCE CRITERIA	
		provision of on-the-job training
2 Conduct maintenance	2.1	Equipment is replaced, if required, due to faulty operation or maintenance plan requirements in accordance with manufacturer specifications and site procedures
	2.2	Documented service checklists (or similar documentation) are followed
	2.3	Diagnostic testing and data from monitoring systems are used to identify those components requiring maintenance
	2.4	Equipment is dismantled, if required, for maintenance in accordance with manufacturer specifications and site procedures.
	2.5	Techniques are used to enable identification and/or re-assembly in accordance with job requirements and site procedures.
	2.6	New components, if required, are obtained and inspected for compliance with manufacturer specifications.
	2.7	Equipment is tested, monitored and adjusted as required in accordance with manufacturer specifications and site/enterprise requirements.
3 Complete the work	3.1	Work is completed and appropriate personnel notified in accordance with site/enterprise requirements
	3.2	Work area is cleared of waste, cleaned, restored and secured in accordance with site/enterprise procedures
	3.3	Plant, tools and equipment are maintained and stored in accordance with site/enterprise procedures
	3.4	Work completion details are finalised in accordance with site/enterprise procedures
	3.5	Lessons learnt from the activity or experience are shared with other team members and recorded for

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ELEMENT **PERFORMANCE CRITERIA**

future reference.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

KS01-PM37 Maintain Large Scale Wind Turbine Generators (WTGs)
1A

Evidence shall show that knowledge has been acquired of maintaining large scale wind turbine generators (WTGs) to the extent indicated by the following aspects:

T1. Wind generation industry environmental, work health and safety

- Legislation and regulations relevant to the wind generation industry
- Manual handling requirements as applicable to the wind generation industry
- Working at heights as applicable to the wind generation industry
- Rigging and lifting equipment
- Working in environmental climates subject to high wind velocity

T2. Quality principles and enterprise requirements as applicable to the wind generation industry

T3. Wind farm principles

- Relevant plant and equipment, its location and operating parameters
- Electric motor types and characteristics as applicable to the wind generation industry
- Switchgear types and characteristics as applicable to the wind generation industry
- Electrical protection types and characteristics as applicable to the wind generation industry
- Wind turbine generator types and characteristics
- Wind turbine support systems

T4. Enterprise procedures and documentation

- Plant drawings and manufacturers manuals
- Enterprise work completion documentation

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REQUIRED SKILLS AND KNOWLEDGE

- Enterprise timesheets

T5. Introduction to, and typical arrangements of, power production plant

- Plant status
- Control and data acquisition systems

T6. Electrical fundamentals

- Voltage, current, power and resistance
- DC and AC
- Voltages present in and around a WTG
- Wiring conventions used in and around WTGs
- Digital multimeters

T7. Levelling and aligning techniques

T8. Isolation procedures

T9. High torqueing tools and adjustments

- Lubrication principles, types and application as applicable to the wind generation industry

Evidence Guide

EVIDENCE GUIDE

9) The Evidence Guide forms an integral part of this Unit and shall be used in conjunction with all components parts of this unit and performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the industry-preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accordance with industry

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and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Sources of evidence need to be 'rich' in nature to minimise error in judgment.

Activities associated with normal everyday work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines, Section 3.1 of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated:

- On at least two (2) occasions. In accordance with the "Assessment Guidelines" for the UEP12 Training Package.

Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframe typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and range; and
  - Apply sustainable energy principles and practices as

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specified in the Performance Criteria and range; and

- Demonstrate an understanding of the required skills and knowledge as described in this unit to such an extent that the learner's performance outcome is reported in accordance with the preferred approach; namely a percentile graded result, where required by the regulated environment; and
- Demonstrate an appropriate level of employability skills; and
- Conduct work observing the relevant Anti Discrimination legislation, regulations, policies and workplace procedures; and

Demonstrated performance across a representative range of contexts from the prescribed items below:

A	All of the following	• Climb the tower using all appropriate safety equipment and procedures. • Lift a load (such as a small motor) to the height of the nacelle.
B	All of the following	• Apply the braking systems. • Mechanically and electrically isolate the system.
C	All of the following	• Check tension of bolts • Replace a bearing • Clean slip rings • Replace a seal or an o-ring
D	All of the following	• Connect a diagnostic computer (or similar) to the system and read and interpret problem-solving data
E	All of the following	• Replace grease in automatic greasing systems. • Confirm oil levels and top-up as required. • Clean up lubrication spills.
F	All of the following	• Read a maintenance schedule. • Complete enterprise documentation after maintenance activities.
G	All of the following	• Remediate surface rust or corrosion
H	All of the following	• Deal with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions.

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Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

These should be used in the formal learning/assessment environment.

Note:

Where simulation is considered a suitable strategy for assessment, conditions must be authentic and as far as possible reproduce and replicate the workplace and be consistent with the approved industry simulation policy.

The resources used for assessment should reflect current industry practices in relation to:

Maintain large scale wind turbine generators

Method of assessment

9.4)

This unit shall be assessed by methods given in the Assessment Guidelines, Section 1.3 of this Training Package.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this competency standard unit applies. This requires assessment in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with

9.5)

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other units

There are no concurrent assessment recommendations for this unit.

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Climbing equipment includes personnel lifts, climb assist, elevators, ladders

Lifting apparatus includes winches and cranes

Hydraulic equipment includes turbine braking equipment.

Maintenance may include: visual inspections, replacement of mechanical components, checking the tension of bolts, replacing bearings, replacing seals and o-rings, condition monitoring, lubrication, testing of equipment for correct operation, cleaning of slip rings and lubrication of equipment.

Tools may include spanners, screwdrivers, side cutters, pliers, high torque wrench, grease pump, digital multimeter.

Test equipment may include laser alignment tools, multimeters, laptop computers, PC tablet, smart phones and other data acquisition tools and equipment.

Consumables may include gearbox oils, bearing grease, paint, detergents, ‘Loctite’

Cleaning includes the removal of the following from equipment and gear:

Grease from bearings

Oil spills

Dust

Large Scale Wind Generators (WTGs) include systems having a rating of greater than 10 kW

Work completion details may include plant and maintenance records, job cards, check sheets, on device labelling updates and reporting and/or documenting equipment defects.

Work site environment may be affected by nearby plant or processes and climatic conditions e.g. wind speed, chemical, heat, dust, noise, height and oil.

Location of wind turbine generators may be in urban, suburban, regional or rural locales and environments.

Isolations can refer to electrical/mechanical or other associated processes.

Generic terms used throughout this Vocational Standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these

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RANGE STATEMENT

and other terms that apply are given in the Glossaries, Section 2.1 of this Training Package.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Maintenance

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UEPMNT401B Install and maintain complex mechanical seals

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to undertake all work associated with the installation and maintenance of complex mechanical seals and which may involve fault finding, diagnosis and repairs.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
UEPMNT304B	Maintain Mechanical Pumps
MEM18006C	Repair and fit engineering components
MEM09002B	Interpret technical drawing
MEM12023A	Perform Engineering Measurements
MEM18001C	Use hand tools
MEM18002B	Use power tools/hand held operations
MEM18003C	Use tools for precision work
MEM18055B	Dismantle, replace and assemble engineering components

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 4 Writing 4 Numeracy 4

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Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and prepare for the work	1.1 Work requirements are identified from request/work orders or equivalent and clarified/confirmed with appropriate parties or by site inspection
	1.2 Occupational Health and Safety standards, statutory requirements, relevant Australian standards, codes of practice, manufacturers' specifications, environmental requirements and enterprise procedures are identified, applied and monitored throughout the work procedure
	1.3 Resources required to satisfy the work plan are identified, obtained and inspected for compliance with the job specifications
	1.4 Relevant plans, drawings and texts are selected and interpreted in accordance with the work plan
	1.5 Correct size, type and quantity of materials/components are determined, obtained and inspected for compliance with the job

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ELEMENT	PERFORMANCE CRITERIA	
		specifications
	1.6	Work is planned in detail including sequencing and prioritising and considerations made, where appropriate, for the maintenance of plant security and capacity in accordance with system/site requirements
	1.7	Coordination requirements, including requests for isolations where appropriate, are resolved with others involved, affected or required by the work
	1.8	Potential hazards are identified and prevention and/or control measures are selected in accordance with the work plan and site procedures
	1.9	Work area is prepared in accordance with work requirements and site procedures
	1.10	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of on-the-job training
2 Remove seals for maintenance	2.1	Required isolations are confirmed where appropriate, in accordance with site requirements
	2.2	Seals are identified in accordance with the work plan
	2.3	Seals are removed in a manner which will assist in replacement in accordance with the work plan
	2.4	Seals are inspected for abnormalities in accordance with the work plan
3 Maintain complex seals	3.1	Maintenance is performed in accordance with manufacturers specifications and site procedures
	3.2	Seal assemblies are dismantled using appropriate engineering principles and technical procedures in accordance with the job plan and site requirements
	3.3	Component parts are clearly marked and sketches produced as required for identification

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ELEMENT	PERFORMANCE CRITERIA	
		in accordance with the job plan and site requirements
	3.4	Component wear and clearances are determined using precise measuring techniques and appropriate test equipment in accordance with manufacturer specifications and site requirements
	3.5	Components found to be faulty are repaired, replaced and/or adjusted to conform with manufacturer specifications and site requirements
	3.6	New components are inspected for compliance to required specifications and prepared for reassembly according to manufacturer specifications /site requirements
	3.7	Component parts are refitted to seal assemblies according to manufacturer specifications /site requirements
	3.8	Modifications/alterations are undertaken in accordance with site requirements
4 Replace/install complex seals	4.1	Site is prepared for seal replacement in accordance with the work plan
	4.2	Seals are replaced in accordance with the work plan and manufacturer specifications
	4.3	All fastenings are torqued in accordance with manufacturer specifications and site requirements
	4.4	Machinery/plant is test run, monitored and adjusted as required in accordance with manufacturer specifications and site requirements
5 Complete the work	5.1	Work is completed and appropriate personnel notified in accordance with site/enterprise requirements
	5.2	Work area is cleared of waste, cleaned, restored and secured in accordance with site/enterprise

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ELEMENT	PERFORMANCE CRITERIA	
		procedures
	5.3	Plant, tools and equipment are maintained and stored in accordance with site/enterprise procedures
	5.4	Work completion details are finalised in accordance with site/enterprise procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the Essential Skills and Knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired installing and maintaining complex mechanical seals.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PM 401B Complex mechanical seals

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant Environmental, Occupational Health and Safety legislation and regulations
- Relevant plant and equipment, its location and operation
- Technical drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Complex mechanical seals
- Precision measuring equipment
- Seals and gaskets (types and materials)
- Bearings (anti-friction and plain)
- Quality assurance/quality control
- Specialised tools and jigs
- Levelling and aligning principles
- Rigging and lifting techniques
- Relevant materials and components
- Hand and portable power tools
- Diagnostic and testing techniques

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REQUIRED SKILLS AND KNOWLEDGE

- Isolation procedures
- Heating techniques

T2 Specific skills needed to achieve the Performance Criteria:

- Apply Relevant Environmental, Occupational Health and Safety legislation and regulations
- Interpret Technical drawings and manufacturers manuals
- Identify and use measuring equipment
- Apply sealing principles
- Manufacture and install seals and gaskets
- Identify and select materials and components
- Use hand and portable power tools
- Apply diagnostic and testing techniques
- Apply dismantling and reassembling techniques
- Apply installation and maintenance procedures
- Recognise worn/damaged components
- Communicate effectively

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment	**9.1)**
	Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or in a realistically simulated work

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environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and

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Range Statement

- Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
- Demonstrate an understanding of the essential knowledge and associated skills as described in 6) of this unit
- Demonstrate an appropriate level of employability skills
- Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures

- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The knowledge and application of relevant sections of: Occupational Health and Safety legislation, statutory legislation, enterprise/site safety procedures and enterprise/site emergency procedures
  - Preparation and planning of work
  - Removal techniques; maintenance techniques and procedures
  - Installation techniques and procedures
  - Completion of work procedures
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment',

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evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment

9.4)

This unit shall be assessed by methods given in 1.3.00 Assessment Guidelines.

Note: Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Complex/specialised seals may include generator seals, double acting mechanical seals, floating seals and turbine labyrinth glands.

Test equipment may include feeler gauge, dial gauge, bearing blue, micrometers, flexi gauge, leads and go/no-go gauges.

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RANGE STATEMENT

Tools and equipment may include micrometers, verniers, dial test indicators, slip gauges, hand tools, customised mandrels, digital height gauges, internal micrometers, oxyacetylene gear, depth gauges, air grinders, jigs and fixtures, customised spanners, electronic internal micrometers, appropriate lifting devices, heated oil bath and induction heaters.

Details of maintenance may be clarified by diagnosis and work place inspection.

Maintenance may include repair, inspection, modification, overhaul, lubrication, servicing and test running.

Work completion details may include plant/maintenance records, job cards, check sheets, on device labelling updates and reporting/documenting equipment defects.

Work site environment may be affected by nearby plant or processes, e.g. chemical, heat, dust, noise, gas and oil.

Isolations can refer to electrical/mechanical or other associated processes.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Maintenance.

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UEPMNT402B Conduct complex levelling and alignment

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to conduct the advanced alignment of plant and machinery and may include high speed rotating plant.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

Pre-Requisites

Prerequisite Unit(s) **4)**

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Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
MEM18009B	Perform levelling and alignment of machines and engineering components
MEM09002B	Interpret technical drawing
MEM12023A	Perform Engineering Measurements
MEM18001C	Use hand tools
MEM18002B	Use power tools/hand held operations
MEM18003C	Use tools for precision work
MEM18055B	Dismantle, replace and assemble engineering components
MEM18006C	Repair and fit engineering components

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 4 Writing 4 Numeracy 4

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Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and prepare for the work	1.1 Work requirements are identified from request/work orders or equivalent and clarified/confirmed with appropriate parties or by site inspection
	1.2 Occupational Health and Safety standards, statutory requirements, relevant Australian standards, codes of practice, manufacturers' specifications, environmental requirements and enterprise procedures are identified, applied and monitored throughout the work procedure
	1.3 Resources required to satisfy the work plan are identified, obtained and inspected for compliance with the job specifications
	1.4 Relevant plans, drawings and texts are selected and interpreted in accordance with the work plan
	1.5 Correct size, type and quantity of materials/components are determined, obtained

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ELEMENT	PERFORMANCE CRITERIA	
		and inspected for compliance with the job specifications
	1.6	Work is planned in detail including sequencing and prioritising and considerations made, where appropriate, for the maintenance of plant security and capacity in accordance with system/site requirements
	1.7	Co-ordination requirements, including requests for isolations where appropriate, are resolved with others involved, affected or required by the work
	1.8	Potential hazards are identified and prevention and/or control measures are selected in accordance with the work plan and site procedures
	1.9	Work area is prepared in accordance with work requirements and site procedures
	1.10	Where appropriate, the teams and individuals roles and responsibilities within the team are identified, and where required, assist in the provision of on-the-job training
2 Perform alignment	2.1	Required isolations are confirmed where appropriate in accordance with enterprise/site requirements
	2.2	Measurements are taken and recorded to facilitate compliance with manufacturer specifications and future job requirements
	2.3	Levelling and alignment calculations are performed and sketches made as required in accordance with the work plan
	2.4	Plant and machinery is levelled and aligned, and adjustments made to ensure compliance with manufacturer specifications and the work plan
	2.5	Final alignment inspections are undertaken and fastenings are torqued in accordance with manufacturer specifications and the work plan

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ELEMENT	PERFORMANCE CRITERIA	
	2.6	Plant and machinery is test run, monitored and adjusted as required in accordance with manufacturer specifications and job/site requirements.
3 Complete the work	3.1	Work is completed and appropriate personnel notified in accordance with site/enterprise requirements
	3.2	Work area is cleared of waste, cleaned, restored and secured in accordance with site/enterprise procedures
	3.3	Plant, tools and equipment are maintained and stored in accordance with site/enterprise procedures
	3.4	Work completion details are finalised in accordance with site/enterprise procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the Essential Skills and Knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired in conducting complex levelling and alignments.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PM 402B Complex levelling and alignment

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant Environmental, Occupational Health and Safety legislation and regulations
- Relevant plant and equipment, its location and operation
- Technical drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Precision measuring equipment

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REQUIRED SKILLS AND KNOWLEDGE

- Advanced levelling and aligning principles
- Couplings
- Engineering mathematical techniques
- Rigging and lifting principles
- Shimming and packing materials
- Bearings and seals
- Technical drawings and data
- Data recording techniques
- Hand and portable power tools

T2 Specific skills needed to achieve the Performance Criteria:

- Apply Relevant Environmental, Occupational Health and Safety legislation and regulations
- Interpret Technical drawings and manufacturers manuals
- Use precision measuring equipment
- Apply advanced levelling and aligning principles
- Apply engineering mathematical techniques
- Use hand and portable power tools
- Identify types and characteristics of couplings, seals and bearings
- Apply data recording techniques
- Work to precise tolerances
- Use rigging and lifting techniques
- Calculate and apply correct adjustment techniques
- Apply testing techniques
- Communicate effectively

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

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Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also

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comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - It is essential that competence is assessed in the critical aspects of: the knowledge and application of relevant sections of Occupational Health and Safety legislation, statutory legislation, enterprise/site safety procedures and enterprise/site emergency procedures; preparation and planning of work; using precision measuring equipment; applying levelling and aligning principles; calculating and applying correct adjustment techniques; completion of work procedures
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or

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simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in 1.3.00 Assessment Guidelines.

Note: Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for

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RANGE STATEMENT

different work environments and situations that will affect performance.

Advanced alignment may include concentricity and ovality checks and adjustments, offsets and thermal expansion checks and adjustments, pre-load centralising and adjustments to within tenths of a thousandth of one inch.

Advanced/complex alignment typically would be of three or more components from the above list.

Equipment and tools may include bearings, couplings, seals, hydraulic tools, rigging equipment, measuring instruments, optical levels, laser levels, electronic levels, slip gauges, dumpy levels and other associated levelling and aligning equipment.

Plant and machines may include turbine rotor, Generator Rotors, Multi-stage compressors and boiler feed pumps.

Work completion details may include plant and maintenance records, job cards and check sheets updating.

Work site environment may be affected by nearby plant or process, e.g., heat, noise, dust, oil, water, chemical.

Isolations can refer to electrical or process.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given inSection 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Maintenance.

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UEPMNT403B Maintain complex mechanical valves

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to undertake the fault finding, diagnosis, repair and/or overhaul of complex mechanical valves, but excluding associated servo or actuating units.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
UEPMNT303B	Maintain Mechanical Valves
MEM18006C	Repair and fit engineering components
MEM09002B	Interpret technical drawing
MEM12023A	Perform Engineering Measurements
MEM18001C	Use hand tools
MEM18002B	Use power tools/hand held operations
MEM18003C	Use tools for precision work
MEM18055B	Dismantle, replace and assemble engineering components

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 4 Writing 4 Numeracy 4

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Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and prepare for the work	1.1 Work requirements are identified from request/work orders or equivalent and clarified/confirmed with appropriate parties or by site inspection
	1.2 Occupational Health and Safety standards, statutory requirements, relevant Australian standards, codes of practice, manufacturer specifications , environmental requirements and enterprise procedures are identified, applied and monitored throughout the work procedure
	1.3 Resources required to satisfy the work plan are identified, obtained and inspected for compliance with the job specifications
	1.4 Relevant plans, drawings and texts are selected and interpreted in accordance with the work plan
	1.5 Correct size, type and quantity of materials/components are determined, obtained and inspected for compliance with the job

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ELEMENT		PERFORMANCE CRITERIA	
			specifications
		1.6	Work is planned in detail including sequencing and prioritising and considerations made, where appropriate, for the maintenance of plant security and capacity in accordance with system/site requirements
		1.7	Co-ordination requirements, including requests for isolations where appropriate, are resolved with others involved, affected or required by the work
		1.8	Potential hazards are identified and prevention and/or control measures are selected in accordance with the work plan and site procedures
		1.9	Work area is prepared in accordance with work requirements and site procedures
		1.10	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2	Remove valves for maintenance	2.1	Required isolations are confirmed where appropriate, in accordance with site requirements
		2.2	Valve is disconnected in accordance with the work plan
		2.3	Valve is removed in a manner which will assist in replacement in accordance with the work plan.
		2.4	Valve is inspected for abnormalities in accordance with the work plan.
3	Perform valve maintenance	3.1	Maintenance is performed in accordance with manufacturer specifications and the work plan
		3.2	Valve is dismantled, clearly marked for identification and relevant sketches drawn in accordance with the work plan
		3.3	Components are correlated in preparation for re-assembly in accordance with manufacturer’s

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ELEMENT	PERFORMANCE CRITERIA	
		drawings/manuals
	3.4	New components are inspected to ensure compliance with manufacturer specifications
	3.5	Dimensional inspection is performed with precision measuring devices to ensure compliance with manufacturer specifications and site requirements
	3.6	Components are reassembled for testing in accordance with manufacturer specifications and site requirements
	3.7	Modifications/alterations are undertaken in accordance with manufacturer specifications and site requirements
	3.8	Components are levelled, aligned, coupled and connected in accordance with manufacturer specifications and site requirements.
	3.9	Valves are pressure tested, monitored and adjusted if required in accordance with manufacturer specifications and the work plan
4 Replace/install valves	4.1	Site is prepared for valve replacement in accordance with the work plan
	4.2	Valve is replaced in accordance with the work plan and manufacturer specifications
	4.3	Valve is connected in accordance with the work plan and manufacturer specifications
	4.4	Final job inspection is completed and any permits relinquished in accordance with the work plan
5 Complete the work	5.1	Work is completed and appropriate personnel notified in accordance with site/enterprise requirements
	5.2	Work area is cleared of waste, cleaned, restored and secured in accordance with site/enterprise procedures
	5.3	Plant, tools and equipment are maintained and

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ELEMENT	PERFORMANCE CRITERIA
	stored in accordance with site/enterprise procedures
	5.4 Work completion details are finalised in accordance with site/enterprise procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the Essential Skills and Knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired in maintaining complex mechanical valves.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PM 403B Complex mechanical valves

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant Environmental, Occupational Health and Safety legislation and regulations
- Relevant plant and equipment, its location and operation
- Technical drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Valve operating and seating arrangements
- Hydraulic and pneumatic principles
- Measuring equipment
- Glands, seals and gaskets
- Bearings
- Quality assurance/quality control
- Specialised tools and jigs
- Levelling and aligning
- Rigging and lifting equipment
- Valve materials and components
- Hand and portable power tools
- Diagnostic and testing techniques

T2 Specific skills needed to achieve the Performance Criteria:

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REQUIRED SKILLS AND KNOWLEDGE

- Apply Relevant Environmental, Occupational Health and Safety legislation and regulations
- Interpret Technical drawings and manufacturers manuals
- Identify and use precision measuring equipment
- Manufacture and install seals and gaskets
- Apply dismantling and assembly techniques
- Select, manufacture and use specialised tools and jigs
- Apply level and alignment techniques
- Use technical drawings and data
- Identify and select materials and components
- Use hand and portable power tools
- Apply diagnostic and testing techniques and rectify faults
- Interpret and apply valve operational techniques
- Recognise worn/damaged components
- Apply effective maintenance procedures
- Apply data analysis techniques and tools
- Communicate effectively

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or in a realistically simulated work

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environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and

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Range Statement

- Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
- Demonstrate an understanding of the essential knowledge and associated skills as described in 6) of this unit
- Demonstrate an appropriate level of employability skills
- Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures

- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Knowledge and application of relevant sections of Occupational Health and Safety legislation, statutory legislation, enterprise/site safety procedures and enterprise/site emergency procedures
  - Preparation and planning of work; removal techniques
  - Maintenance techniques and procedures
  - Installation techniques and procedures
  - Completion of work procedures
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces,

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with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in 1.3.00 Assessment Guidelines.

Note: Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

UEPMNT303B Maintain mechanical valves

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Complex valves may include double seated pressure and flow control valves safety valves, and valves whose actuators are an integral part of the valve and so must be part of any maintenance to the valve.

Precision measuring devices may include inside/outside micrometers, verniers, engineer’s rule, dial gauges, depth gauges and feeler gauges.

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RANGE STATEMENT

Testing may include pressure testing (hydraulic and vacuum), blue check and non-destructive testing.

Valve may control solutions which may include gases; solids; and fluids and chemicals such as caustic soda, chlorine, ammonia, sulphuric acid, sodium hypochlorite, hydrazine, diethylamine, citric acid, hydrofluoric acid, ammonium molydate, trisodium phosphate, hydrogen, nitrogen, carbon dioxide, water, fly-ash, slurry, compressed air, brine, oil, steam (superheated and saturated), hydrogen, propane and carbon dioxide.

Details of maintenance may be clarified by diagnosis and workplace inspection.

Maintenance may include repair, inspection, modification, overhaul, lubrication, servicing, test running, sealing, machining, identifying and replacing defective components and valve packing.

Valve drives may include electrical, mechanical, pneumatic, hydraulic or manual.

Work completion details may include plant and maintenance records, job cards, check sheets, on device labelling updates and reporting and/or documenting equipment defects.

Work site environment may be affected by nearby plant or processes, e.g. chemical, heat, dust, noise, gas and oil, Isolations can refer to electrical/mechanical or other associated processes.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Maintenance.

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UEPMNT404B Maintain complex mechanical pumps

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to undertake the installation and maintenance of multi-stage centrifugal pumps, axial flow compressors, fans and blowers.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
UEPMNT304B	Maintain Mechanical Pumps
MEM18006C	Repair and fit engineering components
MEM09002B	Interpret technical drawing
MEM12023A	Perform Engineering Measurements
MEM18001C	Use hand tools
MEM18002B	Use power tools/hand held operations
MEM18003C	Use tools for precision work
MEM18055B	Dismantle, replace and assemble engineering components

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 4 Writing 4 Numeracy 4

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Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and prepare for the work	1.1 Work requirements are identified from request/work orders or equivalent and clarified/confirmed with appropriate parties or by site inspection
	1.2 Occupational Health and Safety standards, statutory requirements, relevant Australian standards, codes of practice, manufacturer specifications , environmental requirements and enterprise procedures are identified, applied and monitored throughout the work procedure
	1.3 Resources required to satisfy the work plan are identified, obtained and inspected for compliance with the job specifications
	1.4 Relevant plans, drawings and texts are selected and interpreted in accordance with the work plan
	1.5 Correct size, type and quantity of materials/components are determined, obtained and inspected for compliance with the job

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ELEMENT	PERFORMANCE CRITERIA	
		specifications
	1.6	Work is planned in detail including sequencing and prioritising and considerations made, where appropriate, for the maintenance of plant security and capacity in accordance with system/site requirements
	1.7	Co-ordination requirements, including requests for isolations where appropriate, are resolved with others involved, affected or required by the work
	1.8	Potential hazards are identified and prevention and/or control measures are selected in accordance with the work plan and site procedures
	1.9	Work area is prepared in accordance with work requirements and site procedures
	1.10	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of on-the-job training
2 Remove pumps for maintenance	2.1	Required isolations are confirmed, where appropriate, in accordance with site requirements
	2.2	Pump is disconnected in accordance with the work plan
	2.3	Pump is removed in a manner which will assist in replacement in accordance with the work plan
	2.4	Pump is inspected for abnormalities in accordance with the work plan
3 Maintain pumps	3.1	Maintenance is performed in accordance with manufacturer specifications and site procedures
	3.2	Pump is dismantled for maintenance in accordance with manufacturer specifications and site procedures
	3.3	Sketches are made, data noted and components marked for identification and/or re-assembly in accordance with job requirements and site

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ELEMENT	PERFORMANCE CRITERIA	
		procedures
	3.4	New components are obtained and inspected for compliance with manufacturer specifications
	3.5	Dimensional inspection is performed with precision measuring devices to ensure compliance with specifications and results recorded in accordance with job requirements and site procedures
	3.6	Pump is reassembled applying appropriate principles and techniques in accordance with manufacturer specifications and site requirements
	3.7	Modifications/alterations are undertaken in accordance with site requirements
4 Replace/install pumps	4.1	Site is prepared for pump replacement in accordance with the work plan
	4.2	Pump is replaced in accordance with the work plan and manufacturer specifications
	4.3	Pump is levelled, aligned, coupled and connected in accordance with the work plan
	4.4	All fastening are torqued in accordance with manufacturer specifications and site requirements
	4.5	Machinery/plant and pump are test run, monitored and adjusted as required in accordance with manufacturer specifications and site requirements
5 Complete the work	5.1	Work is completed and appropriate personnel notified in accordance with site/enterprise requirements
	5.2	Work area is cleared of waste, cleaned, restored and secured in accordance with site/enterprise procedures
	5.3	Plant, tools and equipment are maintained and stored in accordance with site/enterprise

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ELEMENT	PERFORMANCE CRITERIA
	procedures
	5.4 Work completion details are finalised in accordance with site/enterprise procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the Essential Skills and Knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired in maintaining complex mechanical pumps.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PM 404B Complex mechanical pumps

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant Environmental, Occupational Health and Safety legislation and regulations
- Relevant plant and equipment, its location and operation
- Technical drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Pumps and compressors
- Precision measuring equipment
- Seals and gaskets
- Quality assurance/quality control
- Specialised tools and jigs
- Advanced balancing, levelling and alignment techniques
- Rigging and lifting equipment
- Materials and components of pumps
- Fluid dynamics
- Torque techniques
- Data recording techniques
- Hand and portable power tools
- Diagnostic and testing techniques
- Heating techniques
- Defined tolerances and fits

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REQUIRED SKILLS AND KNOWLEDGE

- Isolation procedures
- Insulation materials
- Complex/multistage pumps, compressors

T2 Specific skills needed to achieve the Performance Criteria:

- Apply Relevant Environmental, Occupational Health and Safety legislation and regulations
- Interpret Technical drawings and manufacturers manuals
- Identify and use precision measuring equipment
- Manufacture and install seals and gaskets
- Apply fluid dynamics principles
- Use specialised tools and jigs
- Apply advanced level and alignment techniques
- Identify and select materials and components
- Apply data analysis techniques
- Identify and apply correct torque techniques
- Use hand and portable hand tools
- Apply diagnostic and testing techniques
- Use heat application equipment
- Apply dismantling and reassembling techniques
- Work to defined tolerances
- Recognise worn/damaged components
- Apply effective maintenance procedures
- Communicate effectively.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment	**9.1)**

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Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also

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comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Preparation and planning of work
  - Removal techniques
  - Maintenance techniques and procedures
  - Installation techniques and procedures
  - Completion of work procedures
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

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Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in 1.3.00 Assessment Guidelines.

Note: Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

UEPMNT304B Maintain mechanical pumps

Range Statement

RANGE STATEMENT

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RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Complex pumps may include multistage centrifugal pumps, multistage compressors and positive displacement pumps

Pump drives may include electrical, internal combustion, hydraulic, pneumatic or steam.

Tools may include micrometers, verniers, dial test indicators, slip gauges, hand tools, hydraulic spanners, customised mandrels, digital height gauges, internal micrometers, depth gauges, air grinders, jigs and fixtures, customised spanners, thermal blankets, induction heaters, thermal crayons, digital thermometers, oxyacetylene gear and appropriate lifting devices.

Details of maintenance may be clarified by diagnosis and workplace inspection.

Maintenance can include repair, inspection, modification, lubrication, servicing, test running, identifying and replacing defective components.

Plant and equipment may include jigs for dismantling and oxyacetylene heating equipment.

Materials may include liquid nitrogen.

Work completion details may include plant and maintenance records, job cards, check sheets, on device labelling updates and reporting and/or documenting equipment defects.

Work site environment may be affected by nearby plant or processes e.g. chemical, heat, dust, noise and oil.

Isolations can refer to electrical/mechanical or other associated processes.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

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Competency Field **11)**

Maintenance.

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UEPMNT406B Install and maintain a steam turbine

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to install HP, IP, LP, SFPT, cylinders, rotors and steam units.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

Pre-Requisites

Prerequisite Unit(s) **4)**

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Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
UEPMNT402B	Conduct Complex Levelling and Alignment
MEM18009B	Perform levelling and alignment of machines and engineering components
MEM09002B	Interpret technical drawing
MEM12023A	Perform Engineering Measurements
MEM18001C	Use hand tools
MEM18002B	Use power tools/hand held operations
MEM18003C	Use tools for precision work
MEM18055B	Dismantle, replace and assemble engineering components
MEM18006C	Repair and fit engineering components

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

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Reading 4 Writing 4 Numeracy 4

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and prepare for the work	1.1 Work requirements are identified from request/work orders or equivalent and clarified/confirmed with appropriate parties or by site inspection
	1.2 Occupational Health and Safety standards, statutory requirements, relevant Australian standards, codes of practice, manufacturer specifications , environmental requirements and enterprise procedures are identified, applied and monitored throughout the work procedure
	1.3 Resources required to satisfy the work plan are identified, obtained and inspected for compliance with the job specifications
	1.4 Relevant plans, drawings and texts are selected

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ELEMENT	PERFORMANCE CRITERIA	
		and interpreted in accordance with the work plan
	1.5	Correct size, type and quantity of materials/components are determined, obtained and inspected for compliance with the job specifications
	1.6	Work is planned in detail including sequencing and prioritising and considerations made, where appropriate, for the maintenance of plant security and capacity in accordance with system/site requirements
	1.7	Co-ordination requirements, including requests for isolations where appropriate, are resolved with others involved, affected or required by the work
	1.8	Potential hazards are identified and prevention and/or control measures are selected in accordance with the work plan and site procedures
	1.9	Work area is prepared in accordance with work requirements and site procedures
	1.10	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of on-the-job training
2 Disassemble turbine	2.1	Required isolations are confirmed where appropriate in accordance with enterprise/site procedures
	2.2	Turbine is disassembled in accordance with manufacturer specifications and work requirements
	2.3	Turbine components are removed in appropriate priority in accordance with manufacturer's specification and work requirements
	2.4	Disassembly is carried out in a manner that will facilitate assembly in accordance with the work plan

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ELEMENT		PERFORMANCE CRITERIA	
		2.5	Components are measured and clearances taken to determine conformity to manufacturer's limits, and to ensure assembly is in accordance with manufacturer specifications
		2.6	Measurements and clearances are recorded in accordance with manufacturer specifications and work requirements.
3	Inspect turbine components	3.1	Components are cleaned and inspected in accordance with the work plan
		3.2	Faults are identified and recorded in accordance with the work plan
		3.3	New components are inspected for compliance to manufacturer specifications and work requirements
		3.4	Components are prepared for assembly in accordance with the work plan
4	Repair turbine/components	4.1	Repairs are carried out in accordance with the work plan
		4.2	Repairs are tested and results analysed to ensure conformance to specifications and in accordance with the work plan
		4.3	Data from testing is recorded in accordance with the work plan and enterprise/site procedures
5	Reassemble turbine	5.1	Site is prepared for re-assembly of turbine in accordance with the work plan and site procedures
		5.2	Components are refitted in accordance with the work plan and manufacturers specifications
		5.3	Turbine is assembled in accordance with the work plan and manufacturer specifications
		5.4	Turbine is test run and operating characteristics are monitored to ensure compliance with manufacturer specifications and enterprise requirements

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ELEMENT	PERFORMANCE CRITERIA	
6 Complete the work	6.1	Work is completed and appropriate personnel notified in accordance with site/enterprise requirements
	6.2	Work area is cleared of waste, cleaned, restored and secured in accordance with site/enterprise procedures
	6.3	Plant, tools and equipment are maintained and stored in accordance with site/enterprise procedures
	6.4	Work completion details are finalised in accordance with site/enterprise procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the Essential Skills and Knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of installing and maintaining a steam turbine.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PM406B A steam turbine

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant Environmental, Occupational Health and Safety legislation and regulations
- Relevant plant and equipment, its location and operation
- Technical drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Hand and portable power tools
- Precision measuring equipment
- Rigging and lifting equipment
- Specialised tools and jigs
- Advanced levelling and aligning techniques
- Diagnostic and testing techniques

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REQUIRED SKILLS AND KNOWLEDGE

- Gaskets and seals
- Bearings (white metal and pad tilting)
- Impulse and reaction blading principles
- Turbine auxiliary systems
- Turbine thermal/mechanical operation
- Thermal and differential expansion principles
- Quality assurance/quality control
- Transmissions
- Couplings
- Hazardous materials
- Optical fibre scope equipment
- Non-destructive testing
- Valves
- Pipe work
- Torqueing techniques
- Data recording techniques

T2 Specific skills needed to achieve the Performance Criteria:

- Apply Relevant Environmental, Occupational Health and Safety legislation and regulations
- Interpret Technical drawings and manufacturers manuals
- Use hand and portable power tools
- Use precise measuring equipment
- Use rigging and lifting equipment
- Use specialised tools and jigs
- Apply advanced balancing, levelling and aligning techniques
- Diagnose and test equipment
- Manufacture gaskets and seals
- Inspect, scrape and blue-check bearings
- Identify hazardous materials
- Identify components
- Recognise worn, damaged or faulty components
- Sequentially assemble and disassemble
- Work to fine tolerances
- Apply non-destructive testing
- Apply torqueing techniques
- Apply maintenance techniques
- Communicate effectively.

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Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

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Critical aspects of evidence required to demonstrate competency in this unit **9.2)**

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 'of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Preparation and planning of work
  - Disassembly techniques
  - Inspection and fault diagnosis techniques and procedures
  - Repair and maintenance techniques and procedures
  - Re-assembly techniques
  - Completion of work procedures
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions

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incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment **9.3)**

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

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Concurrent assessment and relationship with other units **9.5)**

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

UEPMNT402B Conduct complex levelling and alignment.

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Turbines will be steam driven.

Assembly may entail complex/advanced levelling and aligning procedures.

Components may include white metal bearings, tilting pad bearings, roller bearings, thrust bearings lubrication system components, governor system components, cooling systems components, control oil components, sealing components, transmissions and couplings.

Test equipment may include optical fibre scope, gas analysers, pressure recorders and vibration monitors.

Work completion details may include plant and maintenance records, job cards, check sheets, on device labelling updates and reporting and/or documenting equipment defects.

Work site environment may be affected by nearby plant or processes, e.g. chemical, heat, dust, noise, gas and oil.

Isolations can refer to electrical/mechanical or other associated processes.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

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Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Maintenance.

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UEPMNT407B Install and maintain a gas turbine

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to undertake the repair of compressors, turbines and associated equipment on gas turbine units.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to occupational health and safety.

Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

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Prerequisite Unit(s) **4)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
UEPMNT402B	Conduct Complex Levelling and Alignment
MEM18009B	Perform levelling and alignment of machines and engineering components
MEM09002B	Interpret technical drawing
MEM12023A	Perform Engineering Measurements
MEM18001C	Use hand tools
MEM18002B	Use power tools/hand held operations
MEM18003C	Use tools for precision work
MEM18055B	Dismantle, replace and assemble engineering components
MEM18006C	Repair and fit engineering components

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 4 Writing 4 Numeracy 4

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Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and prepare for the work	1.1 Work requirements are identified from request/work orders or equivalent and clarified/confirmed with appropriate parties or by site inspection
	1.2 Occupational Health and Safety standards, statutory requirements, relevant Australian standards, codes of practice, manufacturer specifications , environmental requirements and enterprise procedures are identified, applied and monitored throughout the work procedure
	1.3 Resources required to satisfy the work plan are identified, obtained and inspected for compliance with the job specifications
	1.4 Relevant plans, drawings and texts are selected and interpreted in accordance with the work plan

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ELEMENT	PERFORMANCE CRITERIA	
	1.5	Correct size, type and quantity of materials/components are determined, obtained and inspected for compliance with the job specifications
	1.6	Work is planned in detail including sequencing and prioritising and considerations made, where appropriate, for the maintenance of plant security and capacity in accordance with system/site requirements
	1.7	Co-ordination requirements, including requests for isolations where appropriate, are resolved with others involved, affected or required by the work
	1.8	Potential hazards are identified and prevention and/or control measures are selected in accordance with the work plan and site procedures
	1.9	Work area is prepared in accordance with work requirements and site procedures
	1.10	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of on-the-job training
2 Disassemble turbine	2.1	Required isolations are confirmed where appropriate in accordance with enterprise/site procedures
	2.2	Turbine is disassembled in accordance with manufacturer specifications and work requirements
	2.3	Turbine components are removed in appropriate priority in accordance with manufacturer's specification and work requirements
	2.4	Disassembly is carried out in a manner that will facilitate assembly in accordance with the work plan
	2.5	Components are measured and clearances taken to determine conformity to manufacturer's

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ELEMENT		PERFORMANCE CRITERIA	
			limits, and to ensure assembly is in accordance with manufacturer specifications
		2.6	Measurements and clearances are recorded in accordance with manufacturer specifications and work requirements.
3	Inspect turbine components	3.1	Components are cleaned and inspected in accordance with the work plan
		3.2	Faults are identified and recorded in accordance with the work plan
		3.3	New components are inspected for compliance to manufacturer specifications and work requirements
		3.4	Components are prepared for assembly in accordance with the work plan
4	Repair turbine/components	4.1	Repairs are carried out in accordance with the work plan
		4.2	Repairs are tested and results analysed to ensure conformance to specifications and in accordance with the work plan
		4.3	Data from testing is recorded in accordance with the work plan and enterprise/site procedures
5	Reassemble turbine	5.1	Site is prepared for re-assembly of turbine in accordance with the work plan and site procedures
		5.2	Components are refitted in accordance with the work plan and manufacturers specifications
		5.3	Turbine is assembled in accordance with the work plan and manufacturer specifications
		5.4	Turbine is test run and operating characteristics are monitored to ensure compliance with manufacturer specifications and enterprise requirements
6	Complete the work	6.1	Work is completed and appropriate personnel notified in accordance with site/enterprise requirements

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ELEMENT	PERFORMANCE CRITERIA	
	6.2	Work area is cleared of waste, cleaned, restored and secured in accordance with site/enterprise procedures
	6.3	Plant, tools and equipment are maintained and stored in accordance with site/enterprise procedures
	6.4	Work completion details are finalised in accordance with site/enterprise procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the Essential Skills and Knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired in installing and maintaining a gas turbine.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PM407B A gas turbine

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant Environmental, Occupational Health and Safety legislation and regulations
- Relevant plant and equipment, its location and operation
- Technical drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Hand and portable power tools
- Precision measuring equipment
- Specialised tools and jigs
- Advanced levelling and aligning techniques
- Diagnostic and testing techniques
- Gaskets and seals
- Gas turbine thermodynamics
- Gas turbine support systems
- Gas turbine combustion systems

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REQUIRED SKILLS AND KNOWLEDGE

- Gas turbine oil systems
- Gas turbine cooling systems
- Quality assurance/quality control
- Transmissions
- Couplings
- Hazardous materials
- Non-destructive testing
- Valves
- Fluid power systems
- Pipe work
- Torqueing techniques

T2 Specific skills needed to achieve the Performance Criteria:

- Apply Relevant Environmental, Occupational Health and Safety legislation and regulations
- Interpret Technical drawings and manufacturers manuals
- Use hand and portable power tools
- Use precise measuring equipment
- Use specialised tools and jigs
- Apply advanced balancing, levelling and aligning techniques
- Diagnose and test
- Manufacture gaskets and seals
- Identify hazardous materials
- Identify components
- Recognise worn, damaged or faulty components
- Sequentially assemble and disassemble
- Work to fine tolerances
- Apply fluid power control principles
- Apply torqueing techniques
- Apply maintenance techniques
- Communicate effectively.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall

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EVIDENCE GUIDE

be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in **9.2)**

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this unit

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Preparation and planning of work
  - Disassembly techniques
  - Inspection and fault diagnosis techniques and procedures
  - Repair and maintenance techniques and procedures
  - Re-assembly techniques
  - Completion of work procedures
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

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Context of and specific resources for assessment **9.3)**

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

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There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

UEPMNT402B Conduct complex levelling and alignment.

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Turbines may be an industrial gas turbine or aero derivative turbine.

Assembly may entail complex/advanced levelling and aligning procedures.

Components may include white metal bearings, tilting pad bearings, roller Bearings, thrust bearings, ball bearings, lubrication system components, control system components, cooling systems components, combustion components, transmissions and couplings.

Test equipment may include optical fibre scope, gas analysers, pressure recorders and vibration monitors, DCS system.

Work completion details may include plant and maintenance records, job cards, check sheets, on device labelling updates and reporting and/or documenting equipment defects.

Work site environment may be affected by nearby plant or processes, e.g. chemical, heat, dust, noise, gas and oil.

Isolations can refer to electrical/mechanical or other associated processes.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

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Competency Field

Competency Field **11)**

Maintenance.

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UEPMNT408B Install hydro turbines

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to install Hydro Turbines.

Application of the Unit

Application of the Unit **2)**

This unit refers to the installation of a Hydro Turbine where the turbine has been removed from service for repair and overhaul.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to occupational health and safety.

Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only

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Prerequisite Unit(s) **4)**

after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
UEPMNT402B	Conduct Complex Levelling and Alignment
MEM18009B	Perform levelling and alignment of machines and engineering components
MEM09002B	Interpret technical drawing
MEM12023A	Perform Engineering Measurements
MEM18001C	Use hand tools
MEM18002B	Use power tools/hand held operations
MEM18003C	Use tools for precision work
MEM18055B	Dismantle, replace and assemble engineering components
MEM18006C	Repair and fit engineering components

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 4 Writing 4 Numeracy 4

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Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and prepare for the work	1.1 Work requirements are identified from request/work orders or equivalent and clarified/confirmed with appropriate parties or by site inspection
	1.2 Occupational Health and Safety standards, statutory requirements, relevant Australian standards, codes of practice, manufacturers' specifications, environmental requirements and enterprise procedures are identified, applied and monitored throughout the work procedure
	1.3 Resources required to satisfy the work plan are identified, obtained and inspected for compliance with the job specifications
	1.4 Relevant plans, drawings and texts are selected and interpreted in accordance with the work plan
	1.5 Correct size, type and quantity of materials/components are determined, obtained and inspected for compliance with the job

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ELEMENT	PERFORMANCE CRITERIA	
		specifications
	1.6	Work is planned in detail including sequencing and prioritising and considerations made, where appropriate, for the maintenance of plant security and capacity in accordance with system/site requirements
	1.7	Co-ordination requirements, including requests for isolations where appropriate, are resolved with others involved, affected or required by the work
	1.8	Potential hazards are identified and prevention and/or control measures are selected in accordance with the work plan and site procedures
	1.9	Work area is prepared in accordance with work requirements and site procedures
	1.10	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2 Disassemble turbine	2.1	Required isolations are confirmed where appropriate in accordance with enterprise/site procedures
	2.2	Turbine is disassembled in accordance with manufacturer specifications and work requirements
	2.3	Turbine components are removed in appropriate priority in accordance with manufacturer's specification and work requirements
	2.4	Disassembly is carried out in a manner that will facilitate assembly in accordance with the work plan
	2.5	Components are measured and clearances taken to determine conformity to manufacturer's limits, and to ensure assembly is in accordance with manufacturer specifications

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ELEMENT		PERFORMANCE CRITERIA	
		2.6	Measurements and clearances are recorded in accordance with manufacturer specifications and work requirements.
3	Inspect turbine components	3.1	Components are cleaned and inspected in accordance with the work plan
		3.2	Faults are identified and recorded in accordance with the work plan
		3.3	New components are inspected for compliance to manufacturer specifications and work requirements
		3.4	Components are prepared for assembly in accordance with the work plan
4	Repair turbine/components	4.1	Repairs are carried out in accordance with the work plan
		4.2	Repairs are tested and results analysed to ensure conformance to specifications and in accordance with the work plan
		4.3	Data from testing is recorded in accordance with the work plan and enterprise/site procedures
5	Re-assemble turbine	5.1	Site is prepared for re-assembly of turbine in accordance with the work plan and site procedures.
		5.2	Isolations are confirmed where appropriate in accordance with enterprise/site procedures
		5.3	Components are refitted in accordance with the work plan and manufacturer specifications.
		5.4	Turbine is assembled in accordance with the work plan and manufacturer specifications.
		5.5	Turbine is test run and operating characteristics are monitored to ensure compliance with manufacturer specifications and enterprise requirements
6	Complete the work	6.1	Work is completed and appropriate personnel notified in accordance with site/enterprise

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ELEMENT	PERFORMANCE CRITERIA	
		requirements
	6.2	Work area is cleared of waste, cleaned, restored and secured in accordance with site/enterprise procedures
	6.3	Plant, tools and equipment are maintained and stored in accordance with site/enterprise procedures
	6.4	Work completion details are finalised in accordance with site/enterprise procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the Essential Skills and Knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired installing hydro turbines.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PM 408B Hydro turbine

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant Environmental, Occupational Health and Safety legislation and regulations
- Relevant plant and equipment, its location and operation
- Technical drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Bernoulli principle
- Hydraulic principles
- Introduction to Dams
- Hydro turbines types and characteristics
- Hydro Turbine governor systems
- Hand and portable power tools
- Precision measuring equipment
- Specialised tools and jigs
- Levelling and aligning techniques

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REQUIRED SKILLS AND KNOWLEDGE

- Diagnostic and testing techniques
- Gaskets and seals
- Bearings (white metal and pad tilting)
- Quality assurance / quality control
- Transmissions/couplings
- Non-destructive testing
- Fundamental principles of electrical generation
- Valves
- Fluid power systems
- Pipe work
- Torqueing techniques
- Data recording techniques
- Isolation procedures
- Rigging equipment and techniques

T2 Specific skills needed to achieve the Performance Criteria:

- Apply Relevant Environmental, Occupational Health and Safety legislation and regulations
- Interpret Technical drawings and manufacturers manuals
- Use hand and portable power tools
- Use precision measuring equipment
- Use rigging and lifting equipment
- Use specialised tools and jigs
- Apply levelling and aligning techniques
- Use drawings and data
- Diagnose and test
- Manufacture gaskets and seals
- Identify components
- Recognise worn, damaged or faulty components
- Apply fluid power control principles
- Apply non-destructive testing
- Apply torqueing techniques
- Apply maintenance techniques
- Communicate effectively.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and

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EVIDENCE GUIDE

must be read in conjunction with the Performance Criteria and the Range Statement of unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment 9.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects 9.2)

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of evidence required to demonstrate competency in this unit

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 'of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Preparation and planning of work
  - Performance assessment techniques
  - Replacement techniques and procedures
  - Completion of work procedures
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

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Context of and specific resources for assessment **9.3)**

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

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There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

UEPMNT402B Conduct complex levelling and alignment

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Hydro turbine types may include Pelton wheel, Francis and Kaplin.

Work site may be affected by nearby plant or processes, e.g. water, noise, oil, confined space and ambient temperatures.

Assembly may entail basic and complex/advanced levelling and aligning procedures.

Components may include white metal bearings, tilting pad bearings, lubrication system components, governor system components, transmissions and couplings.

Test equipment may include optical fibre scope, pressure recorders and vibration monitors.

Work completion details may include plant and maintenance records, job cards, check sheets, on device labelling updates and reporting and/or documenting equipment defects.

Isolations can refer to electrical/mechanical or other associated process.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

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Competency Field **11)**

Maintenance.

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UEPMNT410B Diagnose and repair faults in electronic equipment

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to diagnose and repair faults in electronic equipment to board and component level and may involve the work to be carried out with equipment online.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit may require an electrical licence to practise in the workplace.

Practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
UEENEEG108A	Trouble-shoot and repair faults in low voltage electrical apparatus and circuits
UEENEEE101A	Apply Occupational Health Safety regulations, codes and practices in the workplace
UEENEEE102A	Fabricate, dismantle, assemble of utilities industry components
UEENEEE104A	Solve problems in d.c. circuits
UEENEEE105A	Fix and secure electrotechnology equipment
UEENEEE107A	Use drawings, diagrams, schedules, standards, cords and specifications
UEENEEG006A	Solve problems in single and three phase low voltage machines
UEENEEG033A	Solve problems in single and three phase low voltage electrical apparatus and circuits
UEENEEG063A	Arrange circuits, control and protection for general electrical installations
UEENEEG101A	Solve problems in electromagnetic devices and related circuits

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Prerequisite Unit(s) **4)**

UEENEEG102A	Solve problems in low voltage a.c. circuits
UEENEEG106A	Terminate cables, cords and accessories for low voltage circuits

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 4 Writing 4 Numeracy 4

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and prepare for the work	1.1 Work requirements are identified from request/work orders or equivalent and clarified/confirmed with appropriate parties or by site inspection
	1.2 Occupational Health and Safety standards, statutory requirements, relevant Australian standards, codes of practice, manufacturers' specifications, environmental requirements and enterprise procedures are identified, applied and monitored throughout the work procedure
	1.3 Resources required to satisfy the work plan are identified, obtained and inspected for compliance with the job specifications
	1.4 Relevant plans, drawings and texts are selected and interpreted in accordance with the work plan
	1.5 Correct size, type and quantity of materials/components are determined, obtained and inspected for compliance with the job specifications
	1.6 Work is planned in detail including sequencing and prioritising and considerations made, where appropriate, for the maintenance of plant security and capacity in accordance with system/site requirements
	1.7 Co-ordination requirements, including requests for isolations where appropriate, are resolved with others involved, affected or required by the work
	1.8 Potential hazards are identified and prevention and/or control measures are selected in accordance with the work plan and site procedures
	1.9 Work area is prepared in accordance with work requirements and site procedures
	1.10 Where appropriate, the teams and individuals roles and responsibilities within the team are

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ELEMENT	PERFORMANCE CRITERIA	
		identified and, where required, assist in the provision of the on-the-job training
2 Verify the fault	2.1	Normal performance and function of the equipment is ascertained by consulting appropriate reference sources in accordance with the work plan
	2.2	Fault indicators and appropriate technical information/diagnostic techniques are used to verify reported symptoms/faults in accordance with the work plan
	2.3	Symptoms are reproduced and monitored if possible, whilst due regard for personnel safety and plant security is observed in accordance with the work plan.
3 Find the fault	3.1	Required isolations are confirmed where appropriate in accordance with site requirements
	3.2	Fault finding is carried out in conjunction with others involved in, or affected by, the work in accordance with enterprise/job requirements
	3.3	Equipment components, wires, cables, terminations and support fixings are inspected for obvious faults in accordance with the work plan
	3.4	All appropriate fault finding/diagnostic techniques are identified, selected and used to determine the fault in accordance with the work plan
	3.5	All appropriate components are disconnected to enable accurate test measurements of suspected faulty components without the concern of "back-feed" readings in accordance with the work plan
	3.6	Test and measurement instruments are used in accordance with manufacturer’s instructions and job requirements
4 Determine cause of fault	4.1	All appropriate personnel are consulted in order to obtain as many details relating to the faulty equipment as possible in accordance with the

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ELEMENT	PERFORMANCE CRITERIA	
		work plan
	4.2	Appropriate use is made of any information from fault indicators and maintenance records in accordance with the work plan
	4.3	Valid conclusions about the nature and cause of the fault are reached from analysis of available evidence in accordance with the work plan
5 Repair or rectify the fault	5.1	Required isolations are confirmed where appropriate in accordance with site requirements
	5.2	Appropriate repair procedures are undertaken in conjunction with others involved in, or affected by, the work in accordance with the work plan
	5.3	Faulty, worn, damaged or unsecured components are replaced, repaired or secured in accordance with the work plan
	5.4	Parts and components are selected and replaced as required in accordance with appropriate specifications and the work plan
	5.5	Components disconnected for testing are reconnected having been proven free of faults and all terminations are then checked to ensure they are electrically and mechanically sound in accordance with the work plan
	5.6	All faults are repaired or rectified in accordance with the work plan
	5.7	Final job inspection is performed and permits are relinquished as required in accordance with the work plan
6 Complete the work	6.1	Work is completed and appropriate personnel notified in accordance with site/enterprise requirements
	6.2	Work area is cleared of waste, cleaned, restored and secured in accordance with site/enterprise procedures
	6.3	Plant, tools and equipment are maintained and stored in accordance with site/enterprise

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ELEMENT	PERFORMANCE CRITERIA
	procedures
	6.4 Work completion details are finalised in accordance with site/enterprise procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the Essential Skills and Knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired diagnosing and repairing faults in electronic equipment.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PM 410B Faults in electronic equipment

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant Environmental, Occupational Health and Safety legislation and regulations
- Relevant plant and equipment, its location and operation
- Technical drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Relevant state and territory regulations
- Relevant Australian standards
- Equipment and material required to perform the work
- Isolation procedures
- Fault finding and diagnostic techniques
- Repair techniques
- Electronic principles
- Electronic equipment
- Regulatory procedures
- Electrical principles
- Test and measurement instruments
- Engineering and electronic workshop practice

T2 Specific skills needed to achieve the Performance Criteria:

- Apply Relevant Environmental, Occupational Health and Safety legislation and

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REQUIRED SKILLS AND KNOWLEDGE

regulations

- Interpret Technical drawings and manufacturers manuals
- Apply relevant state and territory regulations
- Apply relevant Australian standards
- Use tools and relevant equipment
- Use test and measurement instruments
- Verify and identify faults
- Use appropriate fault finding and diagnostic techniques
- Repair faults
- Select materials for the job
- Apply regulatory procedures
- Apply electronic principles
- Apply electrical principles
- Communicate effectively
- Apply data analysis techniques and tools
- Apply engineering and electronic workshop practices

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment	**9.1)**
	Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or in a realistically simulated work environment. It is recognised that, in some circumstances,

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assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement

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- Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
- Demonstrate an understanding of the essential knowledge and associated skills as described in 6) of this unit
- Demonstrate an appropriate level of employability skills
- Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures

- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The knowledge and application of relevant sections of: Occupational Health and Safety legislation; statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures. Where appropriate attainment of an appropriate electrical licence, deeming competency associated with electrical work
  - Preparation and planning of work
  - Verification techniques
  - Diagnostic and fault finding techniques and procedures
  - Repair techniques and procedures
  - Completion of work procedures
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

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In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment

9.4)

This unit shall be assessed by methods given in 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Inspection should be planned with the appropriate parties to determine access, conditions and work requirements.

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RANGE STATEMENT

Equipment may include analysers, recorders, nuclear devices, fire panels, T/C converters, electronic controllers, smart transmitters, coal feeders, belt weighers, PLC's, ultrasonic sensors, turbine/compressor supervisory equipment, combustion control equipment, wear monitors, water ingress protection equipment, printers, compressor surge control equipment, fuel governor equipment, gas detection panels, temperature monitoring equipment, VCRs, closed circuit TVs, communications equipment and protection equipment.

Materials may include cables, solder/flux, lubricants, cleaning solvents, contact cleaners, connectors, adhesives and sealants.

Components may include analyser sensing elements, load cells, PLC input/output blocks, printed circuit boards, protection devices, switches, diodes, transistors, SCR's, triacs, diacs, LED's, integrated circuits, resistors, capacitors, inductors and transformers.

Test and measurement instruments may include multimeter, decade box, d.c., I/V standard, potentiometer, radiation meter, hand-held communicator/ programmer, frequency counter, function generator, CRO, LCR bridge, logic analyser and specialised test equipment.

Work may be performed with equipment on line.

Work completion details may include plant and maintenance records, job cards, check sheets and on device labelling updates.

Work site environment may be affected by nearby plant or processes, e.g. heat, noise, dust, oil, water and chemical.

Isolations can refer to electrical/mechanical or other associated processes.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Maintenance.

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UEPMNT411B Diagnose and repair faults in complex electrical equipment

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to diagnose and repair faults in complex and H.V. electrical equipment, and may involve the work to be carried out with equipment online.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit may require an electrical licence to practise in the workplace.

Practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
UEENEEG108A	Trouble-shoot and repair faults in low voltage electrical apparatus and circuits
UEENEEE101A	Apply Occupational Health Safety regulations, codes and practices in the workplace
UEENEEE102A	Fabricate, dismantle, assemble of utilities industry components
UEENEEE104A	Solve problems in d.c. circuits
UEENEEE105A	Fix and secure electrotechnology equipment
UEENEEE107A	Use drawings, diagrams, schedules, standards, cords and specifications
UEENEEG006A	Solve problems in single and three phase low voltage machines
UEENEEG033A	Solve problems in single and three phase low voltage electrical apparatus and circuits
UEENEEG063A	Arrange circuits, control and protection for general electrical installations
UEENEEG101A	Solve problems in electromagnetic devices and related circuits

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Prerequisite Unit(s) **4)**

UEENEEG102A	Solve problems in low voltage a.c. circuits
UEENEEG106A	Terminate cables, cords and accessories for low voltage circuits

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 4 Writing 4 Numeracy 4

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Plan and prepare for the work	1.1	Work requirements are identified from request/work orders or equivalent and clarified/confirmed with appropriate parties or by site inspection
	1.2	Occupational Health and Safety standards, statutory requirements, relevant Australian standards, codes of practice, manufacturers' specifications, environmental requirements and enterprise procedures are identified, applied and monitored throughout the work procedure
	1.3	Resources required to satisfy the work plan are identified, obtained and inspected for compliance with the job specifications
	1.4	Relevant plans, drawings and texts are selected and interpreted in accordance with the work plan
	1.5	Correct size, type and quantity of materials/components are determined, obtained and inspected for compliance with the job specifications
	1.6	Work is planned in detail including sequencing and prioritising and considerations made, where appropriate, for the maintenance of plant security and capacity in accordance with system/site requirements
	1.7	Co-ordination requirements, including requests for isolations where appropriate, are resolved with others involved, affected or required by the work
	1.8	Potential hazards are identified and prevention and/or control measures are selected in accordance with the work plan and site procedures
	1.9	Work area is prepared in accordance with work requirements and site procedures
	1.10	Where appropriate, the teams and individuals roles and responsibilities within the team are

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ELEMENT	PERFORMANCE CRITERIA	
		identified and, where required, assist in the provision of the on-the-job training
2 Verify the fault	2.1	Normal performance and function of the equipment is ascertained by consulting appropriate reference sources in accordance with the work plan
	2.2	Fault indicators and appropriate technical information/diagnostic techniques are used to verify reported symptoms/faults in accordance with the work plan
	2.3	Symptoms are reproduced and monitored if possible, whilst due regard for personnel safety and plant security is observed in accordance with the work plan
3 Find the fault	3.1	Required isolations are confirmed where appropriate in accordance with site requirements
	3.2	Fault finding is carried out in conjunction with others involved in, or affected by, the work in accordance with enterprise/job requirements
	3.3	Equipment components, wires, cables, terminations and support fixings are inspected for obvious faults in accordance with the work plan
	3.4	All appropriate fault finding/diagnostic techniques are identified, selected and used to determine the fault in accordance with the work plan
	3.5	All appropriate components are disconnected to enable accurate test measurements of suspected faulty components without the concern of "back-feed" readings in accordance with the work plan
	3.6	Test and measurement instruments are used in accordance with manufacturer’s instructions and job requirements
4 Determine cause of fault	4.1	All appropriate personnel are consulted in order to obtain as many details relating to the faulty equipment as possible in accordance with the

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ELEMENT	PERFORMANCE CRITERIA	
		work plan
	4.2	Appropriate use is made of any information from fault indicators and maintenance records in accordance with the work plan
	4.3	Valid conclusions about the nature and cause of the fault are reached from analysis of available evidence in accordance with the work plan
5 Repair or rectify the fault	5.1	Required isolations are confirmed where appropriate in accordance with site requirements
	5.2	Appropriate repair procedures are undertaken in conjunction with others involved in, or affected by, the work in accordance with the work plan
	5.3	Faulty, worn, damaged or unsecured components are replaced, repaired or secured in accordance with the work plan
	5.4	Parts and components are selected and replaced as required in accordance with appropriate specifications and the work plan
	5.5	Components disconnected for testing are reconnected having been proven free of faults and all terminations are then checked to ensure they are electrically and mechanically sound in accordance with the work plan
	5.6	All faults are repaired or rectified in accordance with the work plan
	5.7	Final job inspection is performed and permits are relinquished as required in accordance with the work plan
6 Complete the work	6.1	Work is completed and appropriate personnel notified in accordance with site/enterprise requirements
	6.2	Work area is cleared of waste, cleaned, restored and secured in accordance with site/enterprise procedures
	6.3	Plant, tools and equipment are maintained and stored in accordance with site/enterprise

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ELEMENT	PERFORMANCE CRITERIA	
		procedures
	6.4	Work completion details are finalised in accordance with site/enterprise procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the Essential Skills and Knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired diagnosing and repairing faults in complex electrical equipment.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PM 411B Faults in complex electrical equipment

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant Environmental, Occupational Health and Safety legislation and regulations
- Relevant plant and equipment, its location and operation
- Technical drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Relevant state and territory regulations
- Relevant Australian standards
- Equipment and material required to perform the work
- Isolation procedures
- Fault finding and diagnostic techniques
- Repair techniques
- Electronic equipment
- Electrical principles
- Test and measurement instruments
- Engineering and electronic workshop practice

T2 Specific skills needed to achieve the Performance Criteria:

- Apply Relevant Environmental, Occupational Health and Safety legislation and regulations
- Interpret Technical drawings and manufacturers manuals

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REQUIRED SKILLS AND KNOWLEDGE

- Apply relevant state and territory regulations
- Apply relevant Australian standards
- Use tools and relevant equipment
- Use test and measurement instruments
- Verify and identify faults
- Use appropriate fault finding and diagnostic techniques
- Repair faults
- Select materials for the job
- Apply regulatory procedures;
- Apply electrical principles
- Communicate effectively
- Apply data analysis techniques and tools
- Apply engineering and electronic workshop practices

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by

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various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge

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and associated skills as described in 6) of this unit
- Demonstrate an appropriate level of employability skills
- Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures

- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Where appropriate attainment of an appropriate electrical licence, deeming competency associated with electrical work
  - Preparation and planning of work
  - Verification techniques
  - Diagnostic and fault finding techniques and procedures
  - Repair techniques and procedures
  - Completion of work procedures
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces,

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with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Inspection should be planned with the appropriate parties to determine access, conditions and work requirements.

Equipment may include HV transformers, tap changers, switchgear and associated control panels, alarms, alternators, igniters, flame scanners, unit control panels, mimic

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RANGE STATEMENT

panels, conveyors, alternator cooling systems, automatic voltage regulators, sootblowers, vibratory feeders, battery chargers, precipitators and overhead cranes.

Materials may include masonry anchors, bolts, nuts, washers, screws, rivets, saddles, clips, brackets, solvents, adhesives, insulation tapes, heat shrink, sleeving, spiral binding, cable ties, solder, lubricants, oil, greases, sealants, lugs, connectors, terminal blocks, cable markers, identification labels, transformer oil, jointing compound, cable compounds and phase markers.

Components may include fuses/circuit breakers, timers, contactors, contacts, coils, relays, solenoids, overloads, switches, plugs, busbar, cable, fans, thermostats, elements, seals and motor bearings and brush gear.

Test and measurement instruments may include multimeters, tong testers, insulation resistance/continuity tester, ductor tester, growlers, overload injection tester, liquid leak tester, pressure gauges, vacuum gauges, dew point test equipment, insulating oil tester and specialist test equipment.

Fault finding and diagnostic techniques may include linear approach, half split rule, sensory detection, loop test, insulation/resistance and continuity tests.

Fault indicators may include indication lamps, LEDs, alarms and flag relays.

Work may be performed with equipment on line.

Work completion details may include, plant and maintenance records, job cards, check sheets and on device labelling updates.

Work site environment may be affected by nearby plant or process, e.g. heat, noise, dust, oil, water and chemical.

Isolations can refer to electrical/mechanical or other associated processes.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Maintenance.

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UEPMNT412B Modify complex electrical equipment

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to undertake modifications of complex and H.V electrical equipment and may include, but not be limited to, alterations, additions or adjustments.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit may require an electrical licence to practise in the workplace.

Practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
UEPMNT350B	Modify electrical equipment
UEENEEG108A	Trouble-shoot and repair faults in low voltage electrical apparatus and circuits
UEENEEE101A	Apply Occupational Health Safety regulations, codes and practices in the workplace
UEENEEE102A	Fabricate, dismantle, assemble of utilities industry components
UEENEEE104A	Solve problems in d.c. circuits
UEENEEE105A	Fix and secure electrotechnology equipment
UEENEEE107A	Use drawings, diagrams, schedules, standards, cords and specifications
UEENEEG006A	Solve problems in single and three phase low voltage machines
UEENEEG033A	Solve problems in single and three phase low voltage electrical apparatus and circuits
UEENEEG063A	Arrange circuits, control and protection for general electrical installations
UEENEEG101A	Solve problems in electromagnetic

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Prerequisite Unit(s)	**4)**	
		devices and related circuits
	UEENEEG102A	Solve problems in low voltage a.c. circuits
	UEENEEG106A	Terminate cables, cords and accessories for low voltage circuits

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 4 Writing 4 Numeracy 4

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and prepare for the work	1.1 Work requirements are identified from request/work orders or equivalent and clarified/confirmed with appropriate parties or by site inspection
	1.2 Occupational Health and Safety standards, statutory requirements, relevant Australian standards, codes of practice, manufacturers' specifications, environmental requirements and enterprise procedures are identified, applied and monitored throughout the work procedure
	1.3 Resources required to satisfy the work plan are identified, obtained and inspected for compliance with the job specifications
	1.4 Relevant plans, drawings and texts are selected and interpreted in accordance with the work plan
	1.5 Correct size, type and quantity of materials/components are determined, obtained and inspected for compliance with the job specifications
	1.6 Work is planned in detail including sequencing and prioritising and considerations made, where appropriate, for the maintenance of plant security and capacity in accordance with system/site requirements
	1.7 Co-ordination requirements, including requests for isolations where appropriate, are resolved with others involved, affected or required by the work
	1.8 Potential hazards are identified and prevention and/or control measures are selected in accordance with the work plan and site procedures
	1.9 Work area is prepared in accordance with work requirements and site procedures.
	1.10 Where appropriate, the teams and individuals roles and responsibilities within the team are

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ELEMENT	PERFORMANCE CRITERIA	
		identified and, where required, assist in the provision of the on-the-job training
2 Carry out modification	2.1	Required isolations are confirmed where appropriate in accordance with site requirements
	2.2	Equipment is modified using appropriate plans, drawings and texts in accordance with the work plan
	2.3	Equipment is modified in conjunction with others involved in, or affected by, the work in accordance with the work plan
	2.4	Modifications are carried out, mindful of effects on, or unnecessary loss of, other equipment in accordance with the work plan
	2.5	Modified equipment is set up to suit operational requirements and in accordance with manufacturer specifications and the work plan
	2.6	Final job inspection is performed and permits relinquished as required in accordance with the work plan
3 Complete the work	3.1	Work is completed and appropriate personnel notified in accordance with site/enterprise requirements
	3.2	Work area is cleared of waste, cleaned, restored and secured in accordance with site/enterprise procedures
	3.3	Plant, tools and equipment are maintained and stored in accordance with site/enterprise procedures
	3.4	Work completion details are finalised in accordance with site/enterprise procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

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REQUIRED SKILLS AND KNOWLEDGE

8) This describes the Essential Skills and Knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired modifying complex electrical equipment.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PM 412B Modify complex electrical equipment

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant Environmental, Occupational Health and Safety legislation and regulations
- Relevant plant and equipment, its location and operation
- Technical drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Relevant state and territory regulations
- Relevant Australian standards;
- Equipment and material required to perform the work;
- Isolation procedures;
- General layout of plant/work site and operation of its equipment;
- Modification techniques;
- Complex electrical equipment;
- Electrical principles;
- Test and measurement instruments;
- Circuit plan appreciation;
- Engineering and workshop practice;

T2 Specific skills needed to achieve the Performance Criteria:

- Apply Relevant Environmental, Occupational Health and Safety legislation and regulations
- Interpret Technical drawings and manufacturers manuals
- Apply relevant state and territory regulations
- Apply relevant Australian standards;
- Use tools and relevant equipment;
- Use test and measurement instruments;
- Modify complex electrical equipment;
- Select materials for the job;
- Apply regulatory procedures;
- Apply electrical principles;
- Carry out work completion details;

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REQUIRED SKILLS AND KNOWLEDGE

- Apply data analysis techniques and tools;
- Communicate effectively.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to

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safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Where appropriate attainment of an appropriate electrical licence, deeming competency associated with electrical

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work

- Preparation and planning of work
- Modification techniques and procedures
- Completion of work procedures
- Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment

9.4)

This unit shall be assessed by methods given in 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended

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for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Inspection should be planned with the appropriate parties to determine access, conditions and work requirements.

Equipment may include HV transformers, tap changers, switchgear and associated control panels, alarms, alternators, igniters, flame scanners, unit control panels, mimic panels, conveyors, alternator cooling systems, automatic voltage regulators, sootblowers, vibratory feeders, battery chargers, precipitators and overhead cranes.

Materials may include masonry anchors, bolts, nuts, washers, screws, rivets, saddles, clips, brackets, solvents, adhesives, insulation tapes, heat shrink, sleeving, spiral binding, cable ties, solder, lubricants, oil, greases, sealants, lugs, connectors, terminal blocks, cable markers, identification labels, transformer oil, jointing compound, cable compounds and phase markers.

Components may include fuses/circuit breakers, timers, contactors, contacts, coils, relays, solenoids, overloads, switches, plugs, busbar, cable, fans, thermostats, elements, seals and motor bearings and brush gear.

Test and measurement instruments may include multimeters, tong testers, insulation resistance/continuity tester, ductor tester, growlers, overload injection tester, liquid leak tester, pressure gauges and vacuum gauges.

Work may be performed with equipment on line.

Work completion details may include plant and maintenance records, job cards, check

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RANGE STATEMENT

sheets and on device labelling updates.

Work site environment may be affected by nearby plant or processes, e.g. heat, noise, dust, oil, water and chemical.

Isolations can refer to electrical/mechanical or other associated processes.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Maintenance.

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UEPMNT413B Modify electronic electrical equipment

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to undertake modification of electronic electrical equipment and may include, but not be limited to, alterations, additions or adjustments.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit may require an electrical licence to practise in the workplace.

Practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
UEPMNT350B	Modify electrical equipment
UEENEEG108A	Trouble-shoot and repair faults in low voltage electrical apparatus and circuits
UEENEEE101A	Apply Occupational Health Safety regulations, codes and practices in the workplace
UEENEEE102A	Fabricate, dismantle, assemble of utilities industry components
UEENEEE104A	Solve problems in d.c. circuits
UEENEEE105A	Fix and secure electrotechnology equipment
UEENEEE107A	Use drawings, diagrams, schedules, standards, cords and specifications
UEENEEG006A	Solve problems in single and three phase low voltage machines
UEENEEG033A	Solve problems in single and three phase low voltage electrical apparatus and circuits
UEENEEG063A	Arrange circuits, control and protection for general electrical installations
UEENEEG101A	Solve problems in electromagnetic

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Prerequisite Unit(s) **4)**

	devices and related circuits
UEENEEG102A	Solve problems in low voltage a.c. circuits
UEENEEG106A	Terminate cables, cords and accessories for low voltage circuits

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 4 Writing 4 Numeracy 4

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and prepare for the work	1.1 Work requirements are identified from request/work orders or equivalent and clarified/confirmed with appropriate parties or by site inspection
	1.2 Occupational Health and Safety standards, statutory requirements, relevant Australian standards, codes of practice, manufacturers' specifications, environmental requirements and enterprise procedures are identified, applied and monitored throughout the work procedure
	1.3 Resources required to satisfy the work plan are identified, obtained and inspected for compliance with the job specifications
	1.4 Relevant plans, drawings and texts are selected and interpreted in accordance with the work plan
	1.5 Correct size, type and quantity of materials/components are determined, obtained and inspected for compliance with the job specifications
	1.6 Work is planned in detail including sequencing and prioritising and considerations made, where appropriate, for the maintenance of plant security and capacity in accordance with system/site requirements
	1.7 Co-ordination requirements, including requests for isolations where appropriate, are resolved with others involved, affected or required by the work
	1.8 Potential hazards are identified and prevention and/or control measures are selected in accordance with the work plan and site procedures
	1.9 Work area is prepared in accordance with work requirements and site procedures.
	1.10 Where appropriate, the teams and individuals roles and responsibilities within the team are

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ELEMENT	PERFORMANCE CRITERIA	
		identified and, where required, assist in the provision of the on-the-job training
2 Carry out modification	2.1	Required isolations are confirmed where appropriate in accordance with site requirements
	2.2	Equipment is modified using appropriate plans, drawings and texts in accordance with the work plan
	2.3	Equipment is modified in conjunction with others involved in, or affected by, the work in accordance with the work plan
	2.4	Modifications are carried out, mindful of effects on, or unnecessary loss of, other equipment in accordance with the work plan
	2.5	Modified equipment is set up to suit operational requirements and in accordance with manufacturer specifications and the work plan
	2.6	Final job inspection is performed and permits relinquished as required in accordance with the work plan.
3 Complete the work	3.1	Work is completed and appropriate personnel notified in accordance with site/enterprise requirements
	3.2	Work area is cleared of waste, cleaned, restored and secured in accordance with site/enterprise procedures
	3.3	Plant, tools and equipment are maintained and stored in accordance with site/enterprise procedures
	3.4	Work completion details are finalised in accordance with site/enterprise procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

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REQUIRED SKILLS AND KNOWLEDGE

8) This describes the Essential Skills and Knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired modifying electronic electrical equipment.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PM413B Modify electronic electrical equipment

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant Environmental, Occupational Health and Safety legislation and regulations
- Relevant plant and equipment, its location and operation
- Technical drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Relevant state and territory regulations
- Relevant Australian standards;
- Equipment and material required to perform the work;
- Isolation procedures;
- Modification techniques;
- Electronic electrical equipment;
- Electrical principles;
- Test and measurement instruments;
- Circuit plan appreciation;
- Engineering and electronic workshop practice;

T2 Specific skills needed to achieve the Performance Criteria:

- Apply Relevant Environmental, Occupational Health and Safety legislation and regulations
- Interpret Technical drawings and manufacturers manuals
- Apply relevant state and territory regulations
- Apply relevant Australian standards;
- Use tools and relevant equipment;
- Use test and measurement instruments;
- Modify electronic electrical equipment;
- Select materials for the job;
- Apply electrical principles;
- Carry out work completion details;
- Apply data analysis techniques and tools;
- Communicate effectively;

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REQUIRED SKILLS AND KNOWLEDGE

- Apply engineering and electronic workshop practices.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be

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more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement OH&S workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The knowledge and application of relevant sections of: OH&S legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Where appropriate attainment of an appropriate electrical licence, deeming competency associated with electrical work
  - Preparation and planning of work

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- Modification techniques and procedures
- Completion of work procedures
- Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment **9.3)**

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential

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knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Inspection should be planned with the appropriate parties to determine access, conditions and work requirements.

Equipment may refer to PLC's, I/O modules, VDU's, soft start motor starters, alarms, stabilised power supply units and uninterrupted power supply units.

Materials may refer to insulation tapes, heat shrink, sleeving, spiral binding, cable ties, solder, lubricants, oil, greases, sealants, lugs, connectors, terminal blocks, cable markers and identification labels.

Components may include fuses/circuit breakers, timers, contactors, contacts, coils, relays, resistors, inductors, capacitors, bridge rectifiers, diodes, heat sinks, solenoids, overloads, plug in printed circuit boards, switches, plugs, cable and thermistors.

Test and measurement instruments may include multimeters, tong testers, insulation resistance/continuity tester, ductor tester, overload injection tester, growlers, cathode ray oscilloscope, variac, hand held programmer, frequency generator, high voltage generators and logic probe.

Work completion details may include plant and maintenance records, job cards, check sheets and on device labelling updates.

Work site environment may be affected by nearby plant or processes, e.g. heat, noise, dust, oil, water and chemical.

Isolations can refer to electrical/mechanical or other associated processes.

Generic terms are used throughout this Training Package for vocational standard shall

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RANGE STATEMENT

be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Maintenance.

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UEPMNT414B Test and commission complex electrical equipment

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to conduct testing and commissioning of complex and H.V. electrical wiring systems and equipment.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit may require an electrical licence to practise in the workplace.

Practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
UEPMNT351B	Test and commission electrical equipment
UEENEEG108A	Trouble-shoot and repair faults in low voltage electrical apparatus and circuits
UEENEEE101A	Apply Occupational Health Safety regulations, codes and practices in the workplace
UEENEEE102A	Fabricate, dismantle, assemble of utilities industry components
UEENEEE104A	Solve problems in d.c. circuits
UEENEEE105A	Fix and secure electrotechnology equipment
UEENEEE107A	Use drawings, diagrams, schedules, standards, cords and specifications
UEENEEG006A	Solve problems in single and three phase low voltage machines
UEENEEG033A	Solve problems in single and three phase low voltage electrical apparatus and circuits
UEENEEG063A	Arrange circuits, control and protection for general electrical installations

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Prerequisite Unit(s) **4)**

UEENEEG101A	Solve problems in electromagnetic devices and related circuits
UEENEEG102A	Solve problems in low voltage a.c. circuits
UEENEEG106A	Terminate cables, cords and accessories for low voltage circuits

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 4 Writing 4 Numeracy 4

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and prepare for the work	1.1 Work requirements are identified from request/work orders or equivalent and clarified/confirmed with appropriate parties or by site inspection
	1.2 Occupational Health and Safety standards, statutory requirements, relevant Australian standards, codes of practice, manufacturers' specifications, environmental requirements and enterprise procedures are identified, applied and monitored throughout the work procedure
	1.3 Resources required to satisfy the work plan are identified, obtained and inspected for compliance with the job specifications
	1.4 Relevant plans, drawings and texts are selected and interpreted in accordance with the work plan
	1.5 Correct size, type and quantity of materials/components are determined, obtained and inspected for compliance with the job specifications
	1.6 Work is planned in detail including sequencing and prioritising and considerations made, where appropriate, for the maintenance of plant security and capacity in accordance with system/site requirements
	1.7 Co-ordination requirements, including requests for isolations where appropriate, are resolved with others involved, affected or required by the work
	1.8 Potential hazards are identified and prevention and/or control measures are selected in accordance with the work plan and site procedures
	1.9 Work area is prepared in accordance with work requirements and site procedures
	1.10 Where appropriate, the teams and individuals roles and responsibilities within the team are

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ELEMENT	PERFORMANCE CRITERIA	
		identified and, where required, assist in the provision of the on-the-job training
2 Test wiring systems	2.1	Required isolations are confirmed where appropriate in accordance with site requirements
	2.2	Wiring systems are tested using appropriate plans, drawings and texts in accordance with the work plan
	2.3	Wiring systems are tested in conjunction with others involved in, or affected by, the work in accordance with the work plan
	2.4	Wiring systems, including enclosures/ supports, are inspected prior to testing to ensure absence of any damage, defects and/or signs of deterioration in accordance with the work plan
	2.5	Fixed wiring is tested as appropriate and results/observations are interpreted and documented to confirm compliance with job specifications
3 Test the equipment	3.1	Required isolations are confirmed where appropriate in accordance with site requirements
	3.2	Equipment is tested using appropriate plans, drawings and texts in accordance with the work plan
	3.3	Equipment is tested in conjunction with other involved in, or affected by, the work in accordance with the work plan
	3.4	Required test conditions are confirmed and the equipment is inspected to ensure absence of any damage, defects and/or signs of deterioration in accordance with the work plan
	3.5	Equipment is tested using appropriate test techniques in accordance with the work plan
	3.6	Equipment test results/observations are interpreted and documented to confirm compliance with job specifications

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ELEMENT	PERFORMANCE CRITERIA	
4 Commission the equipment	4.1	Required isolations are confirmed where appropriate in accordance with site requirements
	4.2	Equipment is commissioned using appropriate plans, drawings and texts in accordance with the work plan
	4.3	Equipment is commissioned in conjunction with others involved in, or affected by, the work in accordance with the work plan
	4.4	Equipment is set up in accordance with operational requirements/manufacturer specifications
	4.5	Testing and monitoring procedures are followed and results monitored, interpreted and documented to ensure equipment operates/functions within specifications
	4.6	Equipment is commissioned with due regard being paid to plant security and capacity in accordance with the work plan
	4.7	Final job inspection is carried out and permits relinquished as required in accordance with the work plan
5 Complete the work	5.1	Work is completed and appropriate personnel notified in accordance with site/enterprise requirements
	5.2	Work area is cleared of waste, cleaned, restored and secured in accordance with site/enterprise procedures
	5.3	Plant, tools and equipment are maintained and stored in accordance with site/enterprise procedures
	5.4	Work completion details are finalised in accordance with site/enterprise procedures

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the Essential Skills and Knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired testing and commissioning complex electrical equipment.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PM414B Test and commission complex electrical equipment

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant Environmental, Occupational Health and Safety legislation and regulations
- Relevant plant and equipment, its location and operation
- Technical drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Relevant state and territory regulations
- Relevant Australian standards;
- Equipment and material required to perform the work;
- Isolation procedures;
- Testing and commissioning techniques and procedures;
- Operational requirements of the equipment;
- Complex electrical equipment;
- Regulatory procedures;
- Electrical principles;
- Test and measurement instruments;
- Engineering and electronic workshop practice;

T2 Specific skills needed to achieve the Performance Criteria:

- Apply Relevant Environmental, Occupational Health and Safety legislation and regulations
- Interpret Technical drawings and manufacturers manuals
- Apply relevant state and territory regulations
- Apply relevant Australian standards;
- Use tools and relevant equipment;
- Use test and measurement instruments;
- Inspect and test the wiring systems;
- Inspect, test and monitor equipment;
- Commission complex electrical equipment;

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REQUIRED SKILLS AND KNOWLEDGE

- Select materials for the job;
- Apply regulatory procedures;
- Apply electrical principles;
- Communicate effectively ;
- Apply data analysis techniques and tools;
- Apply engineering and electronic workshop practices.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries

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risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The knowledge and application of relevant sections of:

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Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures

- Where appropriate attainment of an appropriate electrical licence, deeming competency associated with electrical work
- Preparation and planning of work
- Testing techniques
- Commissioning procedures
- Completion of work procedures
- Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment

9.4)

This unit shall be assessed by methods given in 1.3.00 Assessment

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Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Inspection should be planned with the appropriate parties to determine access, conditions and work requirements.

Equipment may include HV transformers, tap changers, switchgear and associated control panels, alarms, alternators, igniters, flame scanners, unit control panels, mimic panels, conveyors, alternator cooling systems, automatic voltage regulators, sootblowers, vibratory feeders, battery chargers, precipitators and overhead cranes.

Materials may include masonry anchors, bolts, nuts, washers, screws, rivets, saddles, clips, brackets, solvents, adhesives, insulation tapes, heat shrink, sleeving, spiral binding, cable ties, solder, lubricants, oil, greases, sealants, lugs, connectors, terminal blocks, cable markers, identification labels, transformer oil, jointing compound, cable compounds and phase markers.

Components may include fuses/circuit breakers, timers, contactors, contacts, coils, relays, solenoids, overloads, switches, plugs, busbar, cable, fans, thermostats,

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RANGE STATEMENT

elements, seals and motor bearings and brush gear.

Fixed wiring tests may include polarity, loop impedance, insulation resistance/continuity tests.

Monitoring equipment may include stopwatch, indication lamps, tachometer/ rev counter, LED displays, VDUs, thermometers, mimic panels, position indicators, audio indicators and chart recorders.

Work may be performed with equipment on line.

Work completion details may include plant and maintenance records, job cards, check sheets and on device labelling updates.

Work site environment may be affected by nearby plant or processes, e.g. heat, noise, dust, oil, water and chemical. Isolations can refer to electrical/mechanical or other associated processes.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Maintenance.

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UEPMNT415B Diagnose and repair faults in complex refrigeration/air conditioning equipment

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to diagnose and repair faults in complex refrigeration/ air conditioning equipment, and associated accessories and wiring systems.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit may require an electrical licence to practise in the workplace.

Practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
UEENEEG108A	Trouble-shoot and repair faults in low voltage electrical apparatus and circuits
UEENEEE101A	Apply Occupational Health Safety regulations, codes and practices in the workplace
UEENEEE102A	Fabricate, dismantle, assemble of utilities industry components
UEENEEE104A	Solve problems in d.c. circuits
UEENEEE105A	Fix and secure electrotechnology equipment
UEENEEE107A	Use drawings, diagrams, schedules, standards, cords and specifications
UEENEEG006A	Solve problems in single and three phase low voltage machines
UEENEEG033A	Solve problems in single and three phase low voltage electrical apparatus and circuits
UEENEEG063A	Arrange circuits, control and protection for general electrical installations
UEENEEG101A	Solve problems in electromagnetic devices and related circuits

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Prerequisite Unit(s) **4)**

UEENEEG102A	Solve problems in low voltage a.c. circuits
UEENEEG106A	Terminate cables, cords and accessories for low voltage circuits

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 4 Writing 4 Numeracy 4

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and prepare for the work	1.1 Work requirements are identified from request/work orders or equivalent and clarified/confirmed with appropriate parties or by site inspection
	1.2 Occupational Health and Safety standards, statutory requirements, relevant Australian standards, codes of practice, manufacturers' specifications, environmental requirements and enterprise procedures are identified, applied and monitored throughout the work procedure
	1.3 Resources required to satisfy the work plan are identified, obtained and inspected for compliance with the job specifications
	1.4 Relevant plans, drawings and texts are selected and interpreted in accordance with the work plan
	1.5 Correct size, type and quantity of materials/components are determined, obtained and inspected for compliance with the job specifications
	1.6 Work is planned in detail including sequencing and prioritising and considerations made, where appropriate, for the maintenance of plant security and capacity in accordance with system/site requirements
	1.7 Co-ordination requirements, including requests for isolations where appropriate, are resolved with others involved, affected or required by the work
	1.8 Potential hazards are identified and prevention and/or control measures are selected in accordance with the work plan and site procedures
	1.9 Work area is prepared in accordance with work requirements and site procedures
	1.10 Where appropriate, the teams and individuals roles and responsibilities within the team are

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ELEMENT	PERFORMANCE CRITERIA	
		identified and, where required, assist in the provision of the on-the-job training
2 Verify the fault	2.1	Normal performance and function of the equipment is ascertained by consulting appropriate reference sources in accordance with the work plan
	2.2	Fault indicators and appropriate technical information/diagnostic techniques are used to verify reported symptoms/faults in accordance with the work plan
	2.3	Symptoms are reproduced and monitored if possible, whilst due regard for personnel safety and plant security is observed in accordance with the work plan.
3 Find the fault	3.1	Required isolations are confirmed where appropriate in accordance with site requirements
	3.2	Fault finding is carried out in conjunction with others involved in or affected by the work in accordance with enterprise/job requirements
	3.3	Equipment components, wires, cables, terminations and support fixings are inspected for obvious faults in accordance with the work plan
	3.4	All appropriate fault finding/diagnostic techniques are identified, selected and used to determine the fault in accordance with the work plan
	3.5	All appropriate components are disconnected to enable accurate test measurements of suspected faulty components without the concern of "back-feed" readings in accordance with the work plan
	3.6	Test and measurement instruments are used in accordance with manufacturer’s instructions and job requirements
4 Determine cause of fault	4.1	All appropriate personnel are consulted in order to obtain as many details relating to the faulty equipment as possible in accordance with the

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ELEMENT	PERFORMANCE CRITERIA	
		work plan
	4.2	Appropriate use is made of any information from fault indicators and maintenance records in accordance with the work plan
	4.3	Valid conclusions about the nature and cause of the fault are reached from analysis of available evidence in accordance with the work plan
5 Repair or rectify the fault	5.1	Required isolations are confirmed where appropriate in accordance with site requirements
	5.2	Appropriate repair procedures are undertaken in conjunction with others involved in or affected by the work in accordance with the work plan
	5.3	Faulty, worn, damaged or unsecured components are replaced, repaired or secured in accordance with the work plan
	5.4	Parts and components are selected and replaced as required in accordance with appropriate specifications and the work plan
	5.5	Components disconnected for testing are reconnected having been proven free of faults and all terminations are then checked to ensure they are electrically and mechanically sound in accordance with the work plan
	5.6	All faults are repaired or rectified in accordance with the work plan
	5.7	Final job inspection is performed and permits are relinquished as required in accordance with the work plan
6 Complete the work	6.1	Work is completed and appropriate personnel notified in accordance with site/enterprise requirements
	6.2	Work area is cleared of waste, cleaned, restored and secured in accordance with site/enterprise procedures
	6.3	Plant, tools and equipment are maintained and stored in accordance with site/enterprise

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ELEMENT	PERFORMANCE CRITERIA	
		procedures
	6.4	Work completion details are finalised in accordance with site/enterprise procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the Essential Skills and Knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired diagnosing and repairing faults in complex refrigeration / air conditioning equipment.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PM415B Faults in complex refrigeration/air conditioning equipment

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant Environmental, Occupational Health and Safety legislation and regulations
- Relevant plant and equipment, its location and operation
- Technical drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Relevant state and territory regulations
- Relevant Australian standards;
- Equipment and material required to perform the work;
- Isolation procedures;
- Refrigeration systems types and characteristics;
- Fault finding and diagnostic techniques;
- Repair techniques;
- Complex air conditioning and refrigeration equipment;
- Environmental legislation;
- Regulatory procedures;
- Electrical principles;
- Test and measurement instruments;
- Engineering and workshop practice;
- Refrigerant gases

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REQUIRED SKILLS AND KNOWLEDGE

T2 Specific skills needed to achieve the Performance Criteria:

- Apply Relevant Environmental, Occupational Health and Safety legislation and regulations
- Interpret Technical drawings and manufacturers manuals
- Apply relevant state and territory regulations
- Apply relevant Australian standards;
- Use test and measurement instruments;
- Use fault finding and diagnostic techniques;
- Determine the cause of faults;
- Repair faults;
- Recover refrigerant gases;
- Select materials for the job;
- Apply electrical principles;
- Communicate effectively ;
- Apply data analysis techniques and tools.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment	**9.1)**
	Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace.

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However, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as

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specified in the Performance Criteria and Range Statement
    - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) of this unit
    - Demonstrate an appropriate level of employability skills
    - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
    - The knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
    - Preparation and planning of work
    - Verification techniques
    - Diagnostic and fault finding techniques and procedures
    - Where appropriate attainment of an appropriate electrical licence, deeming competency associated with electrical work
    - Repair techniques and procedures
    - Completion of work procedures
    - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

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In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment

9.4)

This unit shall be assessed by methods given in 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Inspection should be planned with the appropriate parties to determine access, conditions and work requirements.

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RANGE STATEMENT

Equipment may include air conditioning (refrigerated and evaporative), water coolers, packaged air conditioners, refrigerators, split system air conditioners, cool rooms, constant temperature baths, refrigerant air driers, central air conditioning cooling systems and industrial process freezers.

Materials may include solvents, insulation tape, contact cleaners, heat shrink, vacuum pumps, gas recovery units and gas bottles.

Components may include fuses/circuit breakers, overloads, indicator lamps, plugs, residual current devices, earth leakage circuit breakers, light emitting/power diodes, ultra-sonic level/proximity flow rate sensors, magnetic level switches and plate heater exchange/liquid receiver/liquid injection/TX valve controllers and uninterrupted power supplies.

Test and measurement instruments may include manifold gauges, thermometers, insulation testers, voltmeters, ammeters and refrigerant detectors.

Fault finding and diagnostic techniques may include linear approach, half split rule, sensory detection and insulation/continuity tests.

Tests and operational checks may include correct air circulation, drainage, vibration, correct temperature, noise, pressure checks and leak detection.

Work may be performed with equipment on line.

Work completion details may include plant and maintenance records, job cards, check sheets and on device labelling updates.

Work site environment may be affected by nearby plant or processes, e.g. heat, noise, dust, oil, water and chemical.

Isolations can refer to electrical/mechanical or other associated processes.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Maintenance.

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UEPMNT416B Overhaul electrical generator

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required for the overhaul of an electrical generating set.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to occupational health and safety.

Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been

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Prerequisite Unit(s) **4)**

confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
UEPMNT351B	Test and commission electrical equipment
UEENEEE101A	Apply Occupational Health Safety regulations, codes and practices in the workplace
UEENEEE102A	Fabricate, dismantle, assemble of utilities industry components
UEENEEE104A	Solve problems in d.c. circuits
UEENEEE105A	Fix and secure electrotechnology equipment
UEENEEE107A	Use drawings, diagrams, schedules, standards, cords and specifications
UEENEEG006A	Solve problems in single and three phase low voltage machines
UEENEEG033A	Solve problems in single and three phase low voltage electrical apparatus and circuits
UEENEEG063A	Arrange circuits, control and protection for general electrical installations
UEENEEG101A	Solve problems in electromagnetic devices and related circuits
UEENEEG102A	Solve problems in low voltage a.c. circuits
UEENEEG106A	Terminate cables, cords and accessories for low voltage circuits

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Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 4 Writing 4 Numeracy 4

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and prepare for the work	1.1 Work requirements are identified from request/work orders or equivalent and clarified/confirmed with appropriate parties or by site inspection
	1.2 Occupational Health and Safety standards, statutory requirements, relevant Australian standards, codes of practice, manufacturers’

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ELEMENT	PERFORMANCE CRITERIA	
		specifications, environmental requirements and enterprise procedures are identified, applied and monitored throughout the work procedure
	1.3	Resources required to satisfy the work plan are identified, obtained and inspected for compliance with the job specifications
	1.4	Relevant plans, drawings and texts are selected and interpreted in accordance with the work plan
	1.5	Correct size, type and quantity of materials/components are determined, obtained and inspected for compliance with the job specifications
	1.6	Work is planned in detail including sequencing and prioritising and considerations made, where appropriate, for the maintenance of plant security and capacity in accordance with system/site requirements
	1.7	Co-ordination requirements, including requests for isolations where appropriate, are resolved with others involved, affected or required by the work
	1.8	Potential hazards are identified and prevention and/or control measures are selected in accordance with the work plan and site procedures
	1.9	Work area is prepared in accordance with work requirements and site procedures
	1.10	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2 Carry out generator overhaul	2.1	Required isolations are confirmed where appropriate in accordance with site requirements
	2.2	Generator is overhauled using appropriate plans, drawings and texts in accordance with the work plan

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ELEMENT	PERFORMANCE CRITERIA	
	2.3	Generator is overhauled in conjunction with others involved in, or affected by, the work in accordance with the work plan
	2.4	Maintenance requirements are carried out to ensure generator operates within requirements in accordance with the work plan
	2.5	Pre commissioning tests are conducted to enterprise requirements.
	2.6	Final job inspection is carried out and permits relinquished in accordance with the work plan
3 Complete the work	3.1	Work is completed and appropriate personnel notified in accordance with site/enterprise requirements
	3.2	Work area is cleared of waste, cleaned, restored and secured in accordance with site/enterprise procedures
	3.3	Plant, tools and equipment are maintained and stored in accordance with site/enterprise procedures
	3.4	Work completion details are finalised in accordance with site/enterprise procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the Essential Skills and Knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired overhauling electrical generators.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PM416B Electrical generator

T1 Evidence shall show that knowledge has been acquired for safe working practices

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REQUIRED SKILLS AND KNOWLEDGE

of:

- Relevant Environmental, Occupational Health and Safety legislation and regulations
- Relevant plant and equipment, its location and operation
- Technical drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Relevant state and territory regulations
- Relevant Australian standards;
- Equipment and material required to perform the work
- Isolation procedures
- Maintenance techniques
- Electrical equipment
- Generator types and characteristics
- Regulatory procedures
- Test and measurement instruments
- Engineering and workshop practice

T2 Specific skills needed to achieve the Performance Criteria:

- Apply Relevant Environmental, Occupational Health and Safety legislation and regulations
- Interpret Technical drawings and manufacturers manuals
- Apply relevant state and territory regulations
- Apply relevant Australian standards
- Use tools and relevant equipment
- Use test and measurement instruments
- Select materials for the job
- Apply data analysis techniques and tools
- Communicate effectively

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

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Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit **9.2)**

Before the critical aspects of evidence are considered all pre-requisites shall be met.

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Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Preparation and planning of work
  - Maintenance techniques and procedures
  - Testing Procedures
  - Commissioning Procedures
  - Completion of work procedures
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a

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workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

UEPMNT414B Test and commission complex electrical equipment.

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Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Details of maintenance may be clarified by diagnosis and/or workplace inspection.

Maintenance may include condition monitoring, cleaning, slot wedging, re-insulation, end bell removal, rotor removal, relevant coolers, de-gauzing, field switch and excitation system.

Work completion details may include plant and maintenance records, job cards, check sheets and on device labelling updates.

Work site environment may be affected by nearby plant or processes, e.g. heat, noise, dust, oil, water and chemical.

Isolations can refer to electrical/mechanical or other associated processes.

Equipment may include associated control panels, alarms, alternators, unit control panels, mimic panels, alternator cooling systems, switchgear and overhead cranes.

Components may include circuit breakers, contacts, coils, overload switches, plugs, busbar, cable, fans, thermostats, elements, seals and motor bearings and brush gear.

Fixed wiring tests may include insulation resistance and continuity tests.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Maintenance.

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UEPMNT417B Inspect electrical generators and diagnose faults

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to conduct inspections and diagnose faults in electrical generating sets.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to occupational health and safety.

Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only

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Prerequisite Unit(s) **4)**

after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
UEPMNT351B	Test and commission electrical equipment
UEENEEG108A	Trouble-shoot and repair faults in low voltage electrical apparatus and circuits
UEENEEE101A	Apply Occupational Health Safety regulations, codes and practices in the workplace
UEENEEE102A	Fabricate, dismantle, assemble of utilities industry components
UEENEEE104A	Solve problems in d.c. circuits
UEENEEE105A	Fix and secure electrotechnology equipment
UEENEEE107A	Use drawings, diagrams, schedules, standards, cords and specifications
UEENEEG006A	Solve problems in single and three phase low voltage machines
UEENEEG033A	Solve problems in single and three phase low voltage electrical apparatus and circuits
UEENEEG063A	Arrange circuits, control and protection for general electrical installations
UEENEEG101A	Solve problems in electromagnetic devices and related circuits
UEENEEG102A	Solve problems in low voltage a.c. circuits

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Prerequisite Unit(s) **4)**

UEENEEG106A	Terminate cables, cords and accessories for low voltage circuits

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 4 Writing 4 Numeracy 4

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and prepare for	1.1 Maintenance and operating history is obtained

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ELEMENT		PERFORMANCE CRITERIA	
	the work	1.2	Occupational Health and Safety standards, statutory requirements, relevant Australian standards, codes of practice, manufacturers' specifications and enterprise procedures are identified, applied and monitored throughout the inspection procedure
		1.3	The inspection is planned in detail including sequencing, prioritising and considerations are made where appropriate of relevant technical and engineering procedures.
		1.4	Resources required to satisfy the plan are identified, obtained and inspected for compliance with the job specifications
		1.5	Relevant plans, drawings and texts are selected and interpreted in accordance with the plan
		1.6	Co-ordination requirements, including requests for isolations where appropriate, are resolved with others involved, affected or required by the work
		1.7	Potential hazards are identified and prevention and/or control measures are selected in accordance with the inspection plan and site procedures
		1.8	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2	Carry out generator inspection	2.1	Required isolations are confirmed where appropriate in accordance with site requirements
		2.2	Generator is inspected using appropriate manuals, drawings and texts in accordance with the plan
		2.3	Generator is inspected in conjunction with others involved in, or affected by, the inspection plan
		2.4	Any needs for additional tests/inspections required are defined

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ELEMENT		PERFORMANCE CRITERIA	
		2.5	Inspection is carried out and permits relinquished in accordance with the plan
3	Evaluate/analyse inspection results	3.1	Test/inspection results and data are analysed
		3.2	Conclusions drawn with reference to potential options
		3.3	Specialist assistance is sought when required
4	Prepare remedial action plan	4.1	Action plan is prepared for any required remedial action
		4.2	Remedial action is followed up and checked for effectiveness
5	Update documentation	5.1	All relevant records and documentation are updated in accordance with statutory, industry and enterprise requirements

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the Essential Skills and Knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired inspecting electrical generators and diagnosing faults.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PM417B Electrical generators and diagnose faults

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant Environmental, Occupational Health and Safety legislation and regulations
- Relevant plant and equipment, its location and operation
- Technical drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Relevant state and territory regulations
- Relevant Australian standards

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REQUIRED SKILLS AND KNOWLEDGE

- Isolation procedures
- Generator types and characteristics
- Generator support systems
- Regulatory procedures
- Engineering and workshop practice

T2 Specific skills needed to achieve the Performance Criteria:

- Apply Relevant Environmental, Occupational Health and Safety legislation and regulations
- Interpret Technical drawings and manufacturers manuals
- Apply relevant state and territory regulations
- Apply relevant Australian standards
- Use inspection procedures
- Apply data analysis techniques and tools
- Communicate effectively.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment	**9.1)**
	Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace.

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However, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as

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specified in the Performance Criteria and Range Statement
    - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) of this unit
    - Demonstrate an appropriate level of employability skills
    - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
    - Preparation and planning of work
    - Inspection techniques and procedures
    - Working in a confined space
    - Analyse inspection results and make recommendations

Context of and specific resources for assessment **9.3)**

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in 1.3.00 Assessment Guidelines.

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Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

UEPMNT421B plant and equipment.	Conduct technical inspection of process

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Details of inspection may be clarified by diagnosis of operational information.

Inspection may include windings, end windings and connections, slot wedges, insulation, end bell, excitation systems, automatic voltage regulator and cooling system.

Inspection completion details may include plant and maintenance records, job cards, check sheets and on device labelling updates.

Work site environment may be affected by nearby plant or processes, e.g. heat, noise, dust, oil, water and chemical.

Isolations can refer to electrical/mechanical or other associated processes.

Tests may include visual and sensory, sampling, tensioning and leak testing.

Faults identified may include movement of conductors, leaks in stator cooling

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RANGE STATEMENT

systems, movement of connections and build up of foreign matter.

Appropriate personnel for consultation may include supervisor/team leader or equivalent, technical and engineering officers or equivalent, maintenance staff, power plant operations personnel and external specialist personnel.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Maintenance.

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UEPMNT419B Perform civil drafting

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to perform the drafting and use of drawing equipment as applied to the production of sectional, arrangement, schematic and plan drawings.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
UEENEEE107A	Use drawings, diagrams, schedules, standards, cords and specifications
UEENEEE101A	Apply Occupational Health Safety regulations, codes and practices in the workplace
	OR
MEM09002B	Interpret technical drawing

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 4 Writing 4 Numeracy 4

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the

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Employability Skills	**5)** qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Prepare for drafting	1.1	Work requirements are identified from request/work orders or equivalent and clarified/confirmed with appropriate parties or by site inspection
	1.2	Occupational Health and Safety standards, statutory requirements, relevant Australian standards, codes of practice, manufacturers' specifications, environmental requirements and enterprise procedures are identified, applied and monitored throughout the work procedure
	1.3	Relevant plans, drawings and texts are selected and interpreted in accordance with the work plan
	1.4	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2 Perform civil drafting	2.1	Civil structures and assemblies are drawn using sectional representation in accordance with specification requirements
	2.2	Structures drawn to highlight critical features in accordance with specification requirements

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ELEMENT	PERFORMANCE CRITERIA	
	2.3	Civil assemblies drawn to highlight critical features in accordance with specification requirements
	2.4	Progressive tolerance calculations made to ensure functional operation of civil structures and assemblies
	2.5	Dimensions selected to ensure fit of civil components in accordance with specification requirements
	2.6	Civil components selected from manufacturer's catalogue to meet specified functions
	2.7	Pictorial drawings, such as isometric, produced as requested in accordance with relevant standards
3 Complete the work	3.1	Drawings checked to ensure that assembly is possible in accordance with specification requirements
	3.2	Drawings produced, registered and recorded in accordance with instructions/site documentation procedures
	3.3	Relevant personnel notified and existing drawings/specification sheets updated as required

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the Essential Skills and Knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired performing civil drafting.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PM419B Civil drafting

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REQUIRED SKILLS AND KNOWLEDGE

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant Environmental, Occupational Health and Safety legislation and regulations
- Relevant plant and equipment, its location and operation
- Technical drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Relevant state and territory regulations
- Detailed drafting concepts
- Technical drawings and data
- Engineering practices (civil)
- Engineering drawing equipment
- Civil drawing symbols
- Computer Aided Drawing systems

T2 Specific skills needed to achieve the Performance Criteria:

- Apply Relevant Environmental, Occupational Health and Safety legislation and regulations
- Interpret Technical drawings and manufacturers manuals
- Apply relevant state and territory regulations
- Perform civil drafting
- Use drawing equipment
- Use Computer Aided Drawing systems
- Communicate effectively
- Apply data analysis techniques and tools.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

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Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also

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comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Detailed drafting concepts (Civil)
  - Engineering practices (Civil)
  - Use of engineering drawing equipment
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace

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conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment

9.4)

This unit shall be assessed by methods given in 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of

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RANGE STATEMENT

contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Relevant legislation, standards or codes of practice may apply.

Dimensions may be notated in metric or imperial units.

Drawings may utilise perspective, explosive view or hidden view techniques.

Types of structures drafted may include foundations, plinths, dams, canals, spillways, flumes and roads.

Drawing equipment used may include Computer Aided Drafting (CAD) and conventional drawing tools.

Standard symbols are used.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Maintenance.

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UEPMNT421B Conduct technical inspection of process plant and equipment

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to conduct the technical inspection of a generation plant, equipment, processes and associated infrastructure.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
UEPMNT351B	Test and commission electrical equipment
UEENEEG108A	Trouble-shoot and repair faults in low voltage electrical apparatus and circuits
UEENEEE101A	Apply Occupational Health Safety regulations, codes and practices in the workplace
UEENEEE102A	Fabricate, dismantle, assemble of utilities industry components
UEENEEE104A	Solve problems in d.c. circuits
UEENEEE105A	Fix and secure electrotechnology equipment
UEENEEE107A	Use drawings, diagrams, schedules, standards, cords and specifications
UEENEEG006A	Solve problems in single and three phase low voltage machines
UEENEEG033A	Solve problems in single and three phase low voltage electrical apparatus and circuits
UEENEEG063A	Arrange circuits, control and protection for general electrical installations

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Prerequisite Unit(s) **4)**

UEENEEG101A	Solve problems in electromagnetic devices and related circuits
UEENEEG102A	Solve problems in low voltage a.c. circuits
UEENEEG106A	Terminate cables, cords and accessories for low voltage circuits

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 4 Writing 4 Numeracy 4

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT		PERFORMANCE CRITERIA	
1	Prepare for inspection process plant	1.1	Short term maintenance and operating history is obtained
		1.2	Occupational Health and Safety standards, statutory requirements, relevant Australian standards, codes of practice, manufacturers' specifications and enterprise procedures are identified, applied and monitored throughout the inspection procedure
		1.3	Deviations from normal operational parameters are identified
		1.4	Potential options for cause of deviations are established
		1.5	Needs and outcomes for plant inspections and/or test are defined, in accordance with potential options
		1.6	Appropriate method sheets, check sheets and isolation instructions are obtained
		1.7	Relevant technical and engineering procedures are considered and adapted where required
		1.8	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2	Inspection process plant	2.1	Plant is correctly identified
		2.2	Plant operational status is identified
		2.3	Work is carried out in accordance statutory, enterprise/site requirements
		2.4	Appropriate methods are followed
		2.5	Relevant documentation is completed
		2.6	The needs and outcomes for the inspection are achieved
		2.7	Any needs for additional tests/inspections

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ELEMENT	PERFORMANCE CRITERIA	
		required are defined
	2.8	Plant/equipment is left in a safe condition
	2.9	Plant/equipment availability is declared
	2.10	Specialist assistance is sought when required
3 Evaluate/analyse inspection results	3.1	Test/inspection results and data are analysed
	3.2	Conclusions drawn with reference to potential options
	3.3	Causes for deviations from normal operation are identified
4 Prepare remedial action plan	4.1	Action plan is prepared for any required remedial action
	4.2	Remedial action is followed up and checked for effectiveness
5 Update documentation	5.1	All relevant records and documentation are updated in accordance with statutory, industry and enterprise requirements

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the Essential Skills and Knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired conducting technical inspections of process plants and equipment.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PM421B Technical inspection of process plant and equipment

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant Environmental, Occupational Health and Safety legislation and regulations

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REQUIRED SKILLS AND KNOWLEDGE

- Relevant plant and equipment, its location and operation
- Technical drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Relevant statutory legislation
- Relevant enterprise/site safety procedures
- Enterprise/site emergency procedures and techniques
- Plant status
- Plant operating parameters
- Environmental awareness
- Inspection and test procedures
- Relevant test equipment
- Diagnostic techniques;
- Sampling techniques
- Quality assurance and quality control
- Data logging systems
- Engineering assembly, design and operating principles

T2 Specific skills needed to achieve the Performance Criteria:

- Apply Relevant Environmental, Occupational Health and Safety legislation and regulations
- Interpret Technical drawings and manufacturers manuals
- Apply enterprise recording procedures
- Locate relevant plant and equipment
- Identify plant status
- Recognise abnormal plant operating conditions
- Communicate effectively
- Apply documentation recording procedures
- Recognise worn, damaged or seized components
- Identify components against drawings, manuals and modules
- Select and use engineering procedures and instructions
- Apply sampling techniques
- Apply diagnostic techniques
- Apply data analysis techniques and tools
- Apply testing and inspection techniques
- Use material safety data sheets.

Evidence Guide

EVIDENCE GUIDE

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EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

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Critical aspects of evidence required to demonstrate competency in this unit **9.2)**

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - The process plant and its operating parameters
  - Inspection and test procedures
  - Identifying worn, damaged or faulty plant and equipment
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

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Context of and specific resources for assessment **9.3)**

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

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There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Generation plant and/or equipment may include fired and unfired pressure vessels, pipe work valves and fittings, turbines, generators, chemical and water treatment plant, ashing plant, gas turbine plant, hydro plant, wind farm plant, fuel firing plant, draught plant and pumping equipment.

Safety standards may include relevant sections of Occupational Health and Safety legislation, enterprise safety rules and procedures, relevant state and federal legislation, national standards or codes of practises for plant.

Information and documentation sources may include verbal or written communications; enterprise safety rules documentation/form(s); equipment and alarm manuals; dedicated computer equipment; drawings, logic diagrams; testing procedures; plant records; plant failure reports; enterprise/site standing and operating instructions; enterprise/site log books; manufacturer’s operation and maintenance manuals; and specialist’s reports.

Technical and operational indicators may include stimuli (audio, smell, touch, visual), remote or local indicators and recorders, alarms (visible and or audible) and basic fault finding equipment.

Tests may include stand-by plant tests, pre-commissioning operating tests, functional testing and sampling.

Appropriate personnel for consultation may include supervisor/team leader or equivalent, technical and engineering officers or equivalent, power system control personnel or equivalent, maintenance staff, power plant operations personnel, contractor and external specialist personnel.

Operating environment may be, remote from plant, aided by indicators and monitors, during inclement or otherwise harsh weather conditions, in wet/noisy/dusty/hot areas, during night periods, dependant on duty cycle and working in confined spaces.

Faults and abnormal operating conditions may include, pressure, level, flow, temperature, speed, vibration and mix.

Generic terms are used throughout this Training Package for vocational standard shall

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RANGE STATEMENT

be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Maintenance.

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UEPMNT422B Conduct performance testing on process plant and equipment

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to conduct performance testing on generation plant equipment and processes to assess plant efficiency.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
UEPMNT351B	Test and commission electrical equipment
UEENEEG108A	Trouble-shoot and repair faults in low voltage electrical apparatus and circuits
UEENEEE101A	Apply Occupational Health Safety regulations, codes and practices in the workplace
UEENEEE102A	Fabricate, dismantle, assemble of utilities industry components
UEENEEE104A	Solve problems in d.c. circuits
UEENEEE105A	Fix and secure electrotechnology equipment
UEENEEE107A	Use drawings, diagrams, schedules, standards, cords and specifications
UEENEEG006A	Solve problems in single and three phase low voltage machines
UEENEEG033A	Solve problems in single and three phase low voltage electrical apparatus and circuits
UEENEEG063A	Arrange circuits, control and protection for general electrical installations

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Prerequisite Unit(s) **4)**

UEENEEG101A	Solve problems in electromagnetic devices and related circuits
UEENEEG102A	Solve problems in low voltage a.c. circuits
UEENEEG106A	Terminate cables, cords and accessories for low voltage circuits

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 4 Writing 4 Numeracy 4

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and prepare for performance test	1.1 Request for work is received and appropriate method of testing is determined in accordance with statutory, industry and enterprise/site standards and procedures
	1.2 Safety and plant issues are identified in accordance with enterprise/site procedures
	1.3 Specialist assistance, supplementary functions and personnel are arranged as required
	1.4 Tools and equipment are correctly identified and acquired
	1.5 Test equipment is calibrated as specified in relevant standards or manufacturer's codes and procedures
	1.6 Test procedure is determined and planned in accordance with the manufacturer's codes and procedures
	1.7 Plant is correctly identified and status prior to test is established from the appropriate personnel
	1.8 Authority to carry out work is obtained in accordance with plant operating conditions and load requirements
	1.9 Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2 Perform performance test and collect data	2.1 Plant co-ordinated to initial operating state ready for testing in accordance with statutory, industry and enterprise/site standards and procedures
	2.2 Tests and data collection are performed using appropriate techniques that ensure personnel safety and plant integrity
	2.3 Tests are carried out in accordance with statutory, industry and enterprise/site requirements

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ELEMENT		PERFORMANCE CRITERIA	
		2.4	Data is collected in accordance with statutory, industry and enterprise/site requirements
		2.5	Test results are evaluated to accurately assess performance of plant
		2.6	Plant availability is declared on completion of tests
3	Evaluate and analyse information	3.1	Plant efficiency is evaluated and analysed in accordance with data collected
		3.2	Plant performance is measured against required criteria, in accordance with statutory, industry and enterprise/site requirements
		3.3	Cause of abnormal plant performance is identified by analysing technical and operational information in a logical and sequential manner
		3.4	Plant integrity is maintained through consultation with appropriate personnel and reference to plant technical and operational documentation
		3.5	Test data obtained is critiqued and validated with reference to other information available and applicable test procedure documentation.
4	Complete documentation	4.1	Information and data is co-ordinated and formatted in accordance with enterprise/site requirements
		4.2	Reports and documentation are produced in accordance with statutory, industry and enterprise/site requirements
		4.3	Reports and documentation are presented in a manner to facilitate implementation of any defined recommendations

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

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REQUIRED SKILLS AND KNOWLEDGE

8) This describes the Essential Skills and Knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired conducting performance testing on process plants and equipment.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PM422B Performance testing on process plant and equipment

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant Environmental, Occupational Health and Safety legislation and regulations
- Relevant plant and equipment, its location and operation
- Technical drawings and manufacturers manuals
- Typical arrangements of power production plant
- Relevant state and territory regulations
- Plant operating parameters
- Performance testing and data collection techniques
- Thermodynamics
- Heat Rate and Heat balance
- Turbine performance
- Boiler performance
- Feedwater system performance
- Air heater performance
- Power Plant efficiency losses
- Enterprise recording procedures
- Plant and plant systems
- Plant performance characteristics
- plant efficiency calculations
- Mechanical and electrical processes
- Materials
- Monitoring procedures

T2 Specific skills needed to achieve the Performance Criteria:

- Apply Relevant Environmental, Occupational Health and Safety legislation and regulations
- Interpret Technical drawings and manufacturers manuals
- Apply relevant state and territory regulations
- Apply performance testing and data collection techniques
- Calculate plant efficiency

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REQUIRED SKILLS AND KNOWLEDGE

- Identify plant status
- Record, analyse and use data
- Apply problem solving techniques
- Communicate effectively
- Plan and prioritise work
- Write reports
- Apply data analysis techniques and tools
- Determine plant performance.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

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The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement OH&S workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:

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- The knowledge and application of relevant sections of: OH&S legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
- Plant operating parameters
- Plant performance characteristics
- Mechanical and electrical processes
- Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment

9.4)

This unit shall be assessed by methods given in 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is

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expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Test equipment may include data loggers, calculators, vibration analysis, plant efficiency software, DCS data, personal computers, thermocouples, multimeters, flow meters, gas analysers, oscilloscopes and power factor meters.

Information and documentation sources may include verbal or written communications; enterprise safety rules documentation/form(s); equipment and alarm manuals; dedicated computer equipment; drawings, logic diagrams; testing procedures; plant records; plant failure reports; enterprise/site standing and operating instructions; enterprise/site log books; manufacturer's operation and maintenance manuals; and specialist's reports.

Specialist assistance may be sought such as: metallurgy, original equipment manufacturer personnel, chemical, operating and engineering staff.

Equipment that may be tested turbines, boilers, feedwater systems, air heaters, HRSG, mills, fans, pumps, heat exchangers, fired and unfired pressure vessels; motors, transformers, switch gear; pneumatic, hydraulic and electronic control systems.

Documentation may include enterprise safety rules, Occupational Health and Safety legislation, environmental legislation, operating and maintenance manuals, plans and

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RANGE STATEMENT

diagrams, standards or codes of practise.

Work site environment may be affected by nearby plant or processes, e.g. chemical, heat, noise and gas.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Maintenance.

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UEPMNT424B Monitor efficiency of thermal steam cycle power plant

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required for the collection of data and the calculation of the efficiency of plant associated with the thermal steam cycle.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
UEENEEG108A	Trouble-shoot and repair faults in low voltage electrical apparatus and circuits
UEENEEE101A	Apply Occupational Health Safety regulations, codes and practices in the workplace
UEENEEE102A	Fabricate, dismantle, assemble of utilities industry components
UEENEEE104A	Solve problems in d.c. circuits
UEENEEE105A	Fix and secure electrotechnology equipment
UEENEEE107A	Use drawings, diagrams, schedules, standards, cords and specifications
UEENEEG006A	Solve problems in single and three phase low voltage machines
UEENEEG033A	Solve problems in single and three phase low voltage electrical apparatus and circuits
UEENEEG063A	Arrange circuits, control and protection for general electrical installations
UEENEEG101A	Solve problems in electromagnetic devices and related circuits

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Prerequisite Unit(s) **4)**

UEENEEG102A	Solve problems in low voltage a.c. circuits
UEENEEG106A	Terminate cables, cords and accessories for low voltage circuits

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 4 Writing 4 Numeracy 4

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT		PERFORMANCE CRITERIA	
1	Collect data	1.1	Information is co-ordinated/collected in accordance with statutory, industry and enterprise/site requirements
		1.2	Plant is correctly identified and status established
		1.3`	Tools and equipment are correctly identified and acquired
		1.4	Specialist assistance/equipment is sort when required
		1.5	Information is recorded in accordance with statutory, industry and enterprise/site requirements
		1.6	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2	Perform calculations	2.1	Availability and performance calculations are performed in accordance with statutory, industry and enterprise/site requirements
		2.2	Information input/output is checked for accuracy
		2.3	Performance is measured and calculated in accordance with appropriate statutory requirements and standards
3	Evaluate and analyse information	3.1	Analyse technical and operational information in a logical and sequential manner, and identify if abnormal plant operating condition/performance exists
		3.2	Causes of any abnormal plant efficiency are identified
		3.3	Plant integrity is maintained through consultation and operational documentation
		3.4	Specialist assistance is sought as required
4	Produce report and	4.1	Information and data are co-ordinated and

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ELEMENT	PERFORMANCE CRITERIA	
complete work		documented in accordance with requirements
	4.2	Reports are produced in accordance with statutory, industry and enterprise/site requirements
	4.3	Recommendations are made to appropriate personnel
	4.4	Implementation of recommendations are monitored to ensure plant efficiency

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the Essential Skills and Knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired monitoring efficiency of thermal steam cycle power plants

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PM424B Efficiency of thermal steam cycle power plant

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant Environmental, Occupational Health and Safety legislation and regulations
- Relevant plant and equipment, its location and operation
- Technical drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Performance testing and data collection techniques
- Thermodynamics
- Heat Rate and Heat balance
- Turbine performance
- Boiler performance
- Feedwater system performance
- Air heater performance
- Power Plant efficiency losses
- Enterprise recording procedures

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REQUIRED SKILLS AND KNOWLEDGE

- Plant and plant systems
- Plant performance characteristics
- plant efficiency calculations
- Plant status
- Plant operating parameters
- Plant and plant systems
- Plant performance characteristics
- Mechanical and electrical processes
- Monitoring procedures

T2 Specific skills needed to achieve the Performance Criteria:

- Apply Relevant Environmental, Occupational Health and Safety legislation and regulations
- Interpret Technical drawings and manufacturers manuals
- Apply performance testing and data collection techniques
- Identify plant status
- Record, analyse and use data
- Apply problem solving techniques
- Communicate effectively
- Plan and prioritise work
- Write reports
- Apply data analysis techniques and tools
- Determine plant performance.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment	**9.1)**
	Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that

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can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated

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within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:

- Implement OH&S workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
- Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
- Demonstrate an understanding of the essential knowledge and associated skills as described in 6) of this unit
- Demonstrate an appropriate level of employability skills
- Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures

- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The knowledge and application of relevant sections of: OH&S legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Plant operating parameters
  - Plant performance characteristics
  - Evaluating and analysing information
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of

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work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment and different structural/ construction types and methods and in a variety of environments.

Method of assessment

9.4)

This unit shall be assessed by methods given in 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Test equipment may include data loggers, calculators, plant efficiency software,

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RANGE STATEMENT

personal computers, flow meters, thermocouples, multimeters and flow meters.

Information source may be verbal, written, computer, unit computer logs, enterprise standards, operating and maintenance standards.

Specialist assistance may be sought such as metallurgy, chemical, operating and engineering staff.

Reports may be daily, weekly, quarterly and yearly; electronic, written or verbal.

Documentation may include site instructions, enterprise standing instructions, enterprise safety procedures, operating instructions, Occupational Health and Safety legislation, environmental legislation, operating and maintenance manuals, plans and diagrams.

Work site environment may be affected by nearby plant or processes, e.g. chemical, heat, noise, gas and hazards.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Maintenance.

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UEPMNT425B Maintain complex instrumentation equipment

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to conduct maintenance of complex instrumentation equipment including, but not limited to, multi-loop equipment such as signal characterising, analogue control equipment, microprocessor control such as programmable logic, laboratory and industrial analysers, ultra sonic and nucleonic equipment.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit may require an electrical licence to practise in the workplace.

Practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
UEPMNT356B	Maintain instrumentation equipment
UEENEEI001B	Install and set up transducers and sensing devices
UEENEEE002B	Dismantle, assemble and fabricate electrotechnology components
UEENEEE005B	Fix and secure equipment
UEENEEE007B	Use drawings, diagrams, schedules and manuals

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 4 Writing 4 Numeracy 4

Employability Skills Information

Employability Skills **5)**

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Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and prepare for the work	1.1 Work requirements are identified from request/work orders or equivalent and clarified/confirmed with appropriate parties or by site inspection
	1.2 Occupational Health and Safety standards, statutory requirements, relevant Australian standards, codes of practice, manufacturers' specifications, environmental requirements and enterprise procedures are identified, applied and monitored throughout the work procedure
	1.3 Resources required to satisfy the work plan are identified, obtained and inspected for compliance with the job specifications
	1.4 Relevant plans, drawings and texts are selected and interpreted in accordance with the work plan
	1.5 Correct size, type and quantity of materials/components are determined, obtained and inspected for compliance with the job specifications

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ELEMENT	PERFORMANCE CRITERIA	
	1.6	Work is planned in detail including sequencing and prioritising and considerations made, where appropriate, for the maintenance of plant security and capacity in accordance with system/site requirements
	1.7	Coordination requirements, including requests for isolations where appropriate, are resolved with others involved, affected or required by the work
	1.8	Potential hazards are identified and prevention and/or control measures are selected in accordance with the work plan and site procedures
	1.9	Work area is prepared in accordance with work requirements and site procedures
	1.10	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2 Carry out maintenance	2.1	Required isolations are confirmed where appropriate in accordance with site requirements
	2.2	Equipment is maintained using appropriate plans, drawings and texts in accordance with the work plan
	2.3	Equipment is maintained in conjunction with others involved in, or affected by, the work in accordance with the work plan
	2.4	Calibration and/or adjustments required are carried out to ensure equipment operates within requirements in accordance with the work plan
	2.5	Maintenance and calibration/adjustments carried out mindful of effects on, or unnecessary loss of, other equipment
	2.6	Final job inspection is carried out and permits relinquished in accordance with the work plan
3 Complete the work	3.1	Work is completed and appropriate personnel

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ELEMENT	PERFORMANCE CRITERIA	
		notified in accordance with site/enterprise requirements
	3.2	Work area is cleared of waste, cleaned, restored and secured in accordance with site/enterprise procedures
	3.3	Plant, tools and equipment are maintained and stored in accordance with site/enterprise procedures
	3.4	Work completion details are finalised in accordance with site/enterprise procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the Essential Skills and Knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired maintaining complex instrumentation equipment.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PM 425B Complex instrumentation equipment

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant Environmental, Occupational Health and Safety legislation and regulations
- Relevant plant and equipment, its location and operation
- Technical drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Relevant state and territory regulations
- Equipment and material required to perform the work
- Isolation procedures
- Instrumentation principles and practices
- Instrument calibration techniques
- Maintenance techniques for the equipment
- Complex instrument equipment

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REQUIRED SKILLS AND KNOWLEDGE

- Electrical fundamentals
- Test and measurement instruments
- Engineering and workshop practice
- Distributed control systems
- Programmable logic controller

T2 Specific skills needed to achieve the Performance Criteria:

- Apply Relevant Environmental, Occupational Health and Safety legislation and regulations
- Interpret Technical drawings and manufacturers manuals
- Apply relevant state and territory regulations
- Apply instrumentation principles and practices
- Apply instrument calibration techniques
- Apply relevant Australian standards
- Use tools and relevant equipment
- Use test and measurement instruments
- Use correct maintenance procedures
- Identify and select materials for the job
- Apply regulatory aspects theory
- Apply electrical fundamentals
- Carry out work completion details
- Communicate effectively
- Apply data analysis techniques and tools.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment	**9.1)**
	Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that

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can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

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Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement OH&S workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The knowledge and application of relevant sections of: OH&S legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Where appropriate, attainment of an appropriate electrical licence, deeming competency associated with electrical work
  - Preparation and planning of work
  - Maintenance techniques and procedures
  - Completion of work procedures
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment **9.3)**

This unit should be assessed as it relates to normal work practice

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using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

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Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Inspection should be planned with the appropriate parties to determine access, conditions and work requirements.

Equipment may include CO2, H2, pH, dissolved O2, conductivity and optical density analysers, recorders, nuclear devices, smart transmitters, magflow meters, coal feeders, belt weigher, PLC's, ultrasonic sensors, hydraulic control equipment, turbine supervisory equipment, detectors, test equipment, transducers, pneumatic controllers, fire panels, T/C converters, electronic controllers, wear monitors, printers, printer circuit boards, UV sterilisation equipment, gas detection equipment and surge suppression equipment.

Materials may include lubricants, cleaning solvents, gasket materials and lead test solution.

Components may include gas analyser, sensing elements, liquid analyser sensing elements, columns, thermal/conductive detectors, infra-red sources, filters, chopper motors, balancing motors, servo motors, chart drives, relays, load cells, tachometers, PLC input/output blocks, amplifying modules, servo valves and plug-in printed circuit boards.

Test and measurement instruments may include multimeter, standard gases, decade box, d.c., I/V standard, potentiometer, radiation meter, hand-held communicator/programmer, frequency counter, frequency generator, CRO, variac and specialised test equipment.

Work may be performed with equipment on line.

Work completion details may include plant and maintenance records, job cards, check sheets and on device labelling updates.

Work site environment may be affected by nearby plant or process, e.g. heat, noise, dust, oil, water and chemical.

Isolations can refer to electrical/mechanical or other associated processes.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

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Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Maintenance.

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UEPMNT426B Maintain electronic instrumentation equipment

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to conduct maintenance of electronic instrumentation equipment.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit may require an electrical licence to practise in the workplace.

Practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

Pre-Requisites

Prerequisite Unit(s) **4)**

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Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
UEPMNT356B	Maintain instrumentation equipment
UEENEEI001B	Install and set up transducers and sensing devices
UEENEEE002B	Dismantle, assemble and fabricate electrotechnology components
UEENEEE005B	Fix and secure equipment
UEENEEE007B	Use drawings, diagrams, schedules and manuals

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 4 Writing 4 Numeracy 4

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability

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Employability Skills	**5)** Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and prepare for the work	1.1 Work requirements are identified from request/work orders or equivalent and clarified/confirmed with appropriate parties or by site inspection
	1.2 Occupational Health and Safety standards, statutory requirements, relevant Australian standards, codes of practice, manufacturers' specifications, environmental requirements and enterprise procedures are identified, applied and monitored throughout the work procedure
	1.3 Resources required to satisfy the work plan are identified, obtained and inspected for compliance with the job specifications
	1.4 Relevant plans, drawings and texts are selected and interpreted in accordance with the work plan
	1.5 Correct size, type and quantity of materials/components are determined, obtained and inspected for compliance with the job specifications
	1.6 Work is planned in detail including sequencing and prioritising and considerations made, where appropriate, for the maintenance of plant

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ELEMENT	PERFORMANCE CRITERIA	
		security and capacity in accordance with system/site requirements
	1.7	Coordination requirements, including requests for isolations where appropriate, are resolved with others involved, affected or required by the work
	1.8	Potential hazards are identified and prevention and/or control measures are selected in accordance with the work plan and site procedures
	1.9	Work area is prepared in accordance with work requirements and site procedures
	1.10	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2 Carry out maintenance	2.1	Required isolations are confirmed where appropriate in accordance with site requirements
	2.2	Equipment is maintained using appropriate plans, drawings and texts in accordance with the work plan
	2.3	Equipment is maintained in conjunction with others involved in, or affected by, the work in accordance with the work plan
	2.4	Calibration and/or adjustments required are carried out to ensure equipment operates within requirements in accordance with the work plan
	2.5	Maintenance and calibration/adjustments carried out mindful of effects on, or unnecessary loss of, other equipment
	2.6	Final job inspection is carried out and permits relinquished in accordance with the work plan.
3 Complete the work	3.1	Work is completed and appropriate personnel notified in accordance with site/enterprise requirements

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ELEMENT	PERFORMANCE CRITERIA
	3.2 Work area is cleared of waste, cleaned, restored and secured in accordance with site/enterprise procedures
	3.3 Plant, tools and equipment are maintained and stored in accordance with site/enterprise procedures
	3.4 Work completion details are finalised in accordance with site/enterprise procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the Essential Skills and Knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired maintaining electronic instrumentation equipment.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PM426B Maintain Electronic instrumentation equipment

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant Environmental, Occupational Health and Safety legislation and regulations
- Relevant plant and equipment, its location and operation
- Technical drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Relevant state and territory regulations
- Distributed control systems
- Programmable logic controller
- Instrumentation principles and practices
- Instrument calibration techniques
- Electronic principles
- Equipment and material required to perform the work
- Isolation procedures
- Maintenance techniques for the equipment

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REQUIRED SKILLS AND KNOWLEDGE

- Electronic instrument equipment
- Electrical fundamentals
- Test and measurement instruments
- Engineering and workshop practice

T2 Specific skills needed to achieve the Performance Criteria:

- Apply Relevant Environmental, Occupational Health and Safety legislation and regulations
- Interpret Technical drawings and manufacturers manuals
- Apply relevant state and territory regulations
- Apply electronic principles
- Apply instrumentation principles and practices
- Apply instrument calibration techniques
- Apply relevant Australian standards
- Use tools and relevant equipment
- Use test and measurement instruments
- Use correct maintenance procedures
- Use correct calibration procedures
- Identify and select materials for the job
- Apply instrumentation electronics theory
- Apply electrical fundamentals theory
- Carry out work completion details
- Communicate effectively
- Apply data analysis techniques and tools.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

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Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also

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comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement OH&S workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The knowledge and application of relevant sections of: OH&S legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Where appropriate, attainment of an appropriate electrical licence, deeming competency associated with electrical work
  - Preparation and planning of work
  - Maintenance techniques and procedures
  - Completion of work procedures
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or

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simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

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RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Inspection should be planned with the appropriate parties to determine access, conditions and work requirements.

Equipment may include analysers, recorders, nuclear devices, fire panels, T/C converters, electronic controllers, smart transmitters, coal feeders, belt weighers, PLC's, ultrasonic sensors, turbine/compressor supervisory equipment, combustion control equipment, wear monitors, water ingress protection equipment, printers, compressor surge control equipment, fuel governor equipment, gas detection panels and temperature monitoring equipment.

Materials may include cables, solder/flux, lubricants, cleaning solvents, contact cleaners, connectors, adhesive and sealants.

Components may include analyser sensing elements, load cells, PLC input/output blocks, printed circuit boards, protection devices, switches, diodes, transistors, SCR's, triacs, diacs, LEDs, integrated circuits, resistors, capacitors, inductors and transformers.

Test and measurement instruments may include multimeter, decade box, d.c., I/V standard, potentiometer, radiation meter, hand-held communicator/ programmer, frequency counter, function generator, CRO, LCR bridge, logic analyser and specialised test equipment.

Work may be performed with equipment on line.

Work completion details may include plant and maintenance records, job cards, check sheets and on device labelling updates.

Work site environment may be affected by nearby plant or processes, e.g. heat, noise, dust, oil, water and chemical.

Isolations can refer to electrical/mechanical or other associated processes.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

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Competency Field

Competency Field **11)**

Maintenance.

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UEPMNT427B Diagnose and repair faults in complex instrumentation equipment

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to undertake the diagnose and repair of complex instrumentation configuration including, but not limited to, signal characterising equipment, totaliser units, microprocessor control equipment, interface equipment, laboratory and field analysers, ultrasonic and nucleonic equipment.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit may require an electrical licence to practise in the workplace.

Practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
UEPMNT356B	Maintain instrumentation equipment
UEENEEI001B	Install and set up transducers and sensing devices
UEENEEE002B	Dismantle, assemble and fabricate electrotechnology components
UEENEEE005B	Fix and secure equipment
UEENEEE007B	Use drawings, diagrams, schedules and manuals

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 4 Writing 4 Numeracy 4

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Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and prepare the work	1.1 Work requirements are identified from request/work orders or equivalent and clarified/confirmed with appropriate parties or by site inspection.
	1.2 Occupational Health and Safety standards, statutory requirements, relevant Australian standards, codes of practice, manufacturers' specifications, environmental requirements and enterprise procedures are identified, applied and monitored throughout the work procedures.
	1.3 Resources required to satisfy the work plan are identified, obtained and inspected for compliance with the job specifications.
	1.4 Relevant plans, drawings and texts are selected and interpreted in accordance with the work plan.
	1.5 Correct size, type and quantity of materials/components are determined, obtained and inspected for compliance with the job

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ELEMENT	PERFORMANCE CRITERIA	
		specifications.
	1.6	Work is planned in detail including sequencing and prioritising and considerations made, where appropriate, for the maintenance of plan security and capacity in accordance with system/site requirements.
	1.7	Co-ordination requirements, including requests for isolations where appropriate, are resolved with others involved, affected or required by the work.
	1.8	Potential hazards are identified and prevention and/or control measures are selected in accordance with the work plan and site procedures.
	1.9	Work area is prepared in accordance with work requirements and site procedures.
	1.10	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of on-the-job training.
2 Verify the fault	2.1	Normal performance and function of the equipment is ascertained by consulting appropriate reference sources in accordance with the work plan.
	2.2	Fault indicators, appropriate technical information/diagnostic techniques are used to verify reported symptoms/faults in accordance with the work plan.
	2.3	Symptoms are reproduced and monitored if possible, whilst due regard for personnel safety and plant security is observed in accordance with the work plan.
3 Find the fault	3.1	Required isolations are confirmed where appropriate in accordance with site requirements.
	3.2	Fault finding is carried out in conjunction with others involved in, or affected by, the work in accordance with enterprise/job requirements.

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ELEMENT		PERFORMANCE CRITERIA	
		3.3	Equipment components, wires, cables, terminations and support fixings are inspected for obvious faults in accordance with the work plan.
		3.4	All appropriate fault finding/diagnostic techniques are identified, selected and used to determine the fault in accordance with the work plan.
		3.5	All appropriate components are disconnected to enable accurate test measurements of suspected faulty components without the concern of "back feed" readings in accordance with the work plan.
		3.6	Test and measurement instruments are used in accordance with manufacturers' job requirements.
4	Determine cause of fault	4.1	All appropriate personnel are consulted in order to obtain as many details relating to the faulty equipment as possible in accordance with the work plan.
		4.2	Appropriate use is made of any information from fault indicators and maintenance records in accordance with the work plan.
		4.3	Valid conclusions about the nature and cause of the fault are reached from analysis of available evidence in accordance with the work plan.
5	Repair or rectify the fault	5.1	Required isolations are confirmed where appropriate in accordance with site requirements.
		5.2	Appropriate repair procedures are undertaken in conjunction with others involved in, or affected by, the work in accordance with the work plan.
		5.3	Faulty, worn, damaged or unsecured components are replaced, repaired or secured in accordance with the work plan.
		5.4	Parts and components are selected and replaced as required in accordance with appropriate specifications and the work plan.

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ELEMENT	PERFORMANCE CRITERIA	
	5.5	Components disconnected for testing are reconnected having been proven free of faults and all terminations are then checked to ensure they are electrically and mechanically sound in accordance with the work plan.
	5.6	All faults are repaired or rectified in accordance with the work plan.
	5.7	Final job inspection is performed and permits are relinquished as required in accordance with the work plan.
6 Complete the work	6.1	Work is completed and appropriate personnel notified in accordance with site/enterprise requirements.
	6.2	Work area is cleared of waste, cleaned, restored and secured in accordance with site/enterprise procedures.
	6.3	Plant, tools and equipment are maintained and stored in accordance with site/enterprise procedures.
	6.4	Work completion details are finalised in accordance with site/enterprise procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the Essential Skills and Knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired diagnosing and repairing faults in complex instrumentation equipment.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PM427B Diagnose and repair faults in complex instrumentation equipment

T1 Evidence shall show that knowledge has been acquired for safe working practices

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REQUIRED SKILLS AND KNOWLEDGE

of:

- Relevant Environmental, Occupational Health and Safety legislation and regulations
- Relevant plant and equipment, its location and operation
- Technical drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Relevant state and territory regulations
- Instrumentation principles and practices
- Instrument calibration techniques
- Electronic principles
- relevant Australian standards
- equipment and material required to perform the work
- isolation procedures
- fault finding and diagnostic techniques
- repair techniques
- complex instrumentation equipment
- electrical fundamentals
- test and measurement instruments
- engineering and electronic workshop practice
- Distributed control systems
- Programmable logic controller

T2 Specific skills needed to achieve the Performance Criteria:

- Apply Relevant Environmental, Occupational Health and Safety legislation and regulations
- Interpret Technical drawings and manufacturers manuals
- Apply relevant state and territory regulations
- Apply electronic principles
- Apply instrumentation principles and practices
- Apply instrument calibration techniques
- apply relevant Australian standards
- use tools and relevant equipment
- use test and measurement instruments
- verify and identify faults
- use appropriate fault finding and diagnostic techniques
- determine the cause of faults
- repair faults
- identify and select materials for the job
- apply electrical fundamentals
- carry out work completion details
- apply distributed control theory

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REQUIRED SKILLS AND KNOWLEDGE

- communicate effectively
- apply data analysis techniques and tools
- Apply engineering and electronic workshop practices

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing

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on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The knowledge and application of relevant sections of Occupational Health and Safety legislation, statutory legislation, enterprise/site safety procedures; enterprise/site emergency procedures.

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- Preparation and planning of work; Verification techniques; Diagnostic and fault finding techniques and procedures associated with electrical work; Repair techniques and procedures; Completion of work procedures
- Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment

9.4)

This unit shall be assessed by methods given in 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended

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for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Equipment may include CO2; H2; PH; dissolved O2; conductivity and optical density analysers; recorders; nuclear devices; smart transmitters: magflow meters; coal feeders; belt weigher; PLCs; ultrasonic sensors; hydraulic control equipment; turbine supervisory equipment; detectors; test equipment; transducers; pneumatic controllers; fire panels; T/C converters; electronic controllers; wear monitors; printers; printer circuit boards; UV sterilisation equipment; gas detection equipment and surge suppression equipment.

Materials may include lubricants; cleaning solvents; gasket materials and leak test solution.

Components may include gas analyser; sensing elements; liquid analyser sensing elements; columns; thermal/conductive detectors; infra-red sources; filters; chopper motors; balancing motors; servo motors; chart drives; relays; load cells; tachometers; PLC input/output blocks; amplifying modules; servo valves and plug-in PCBs.

Test and measurement instruments may include multimeter; standard gases; decade box; d.c., I/V standard; potentiometer; radiation meter; hand-held communicator/programmer; frequency counter; frequency generator; CRO, variac and specialised test equipment.

Fault find and diagnostic techniques may include linear approach; half split rule; sensory detection/insulation/resistance and continuity test.

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RANGE STATEMENT

Fault find and diagnostic techniques may include linear approach; half split rule; sensory detection; insulation/resistance and continuity tests.

Fault indicators may include indication lamps; LEDs; alarms and flag relays.

Work may be performed on line.

Work completion details may include plant and maintenance records; job cards; check sheets and on device labelling updates.

Work site environment may be affected by nearby plant or processes, e.g. heat, noise, dust, oil, water and chemical.

Isolations can refer to electrical/mechanical or other associated processes.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Maintenance.

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UEPMNT428B Modify complex instrumentation equipment

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to conduct modification of complex instrumentation used in a “multi-loop” configuration, including, characterising equipment, microprocessor control equipment, interface equipment, laboratory and field analysers, ultra-sonic and nucleonic equipment.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit may require an electrical licence to practise in the workplace.

Practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
UEPMNT356B	Maintain instrumentation equipment
UEENEEI001B	Install and set up transducers and sensing devices
UEENEEE002B	Dismantle, assemble and fabricate electrotechnology components
UEENEEE005B	Fix and secure equipment
UEENEEE007B	Use drawings, diagrams, schedules and manuals

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 4 Writing 4 Numeracy 4

Employability Skills Information

Employability Skills **5)**

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Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and prepare for the work	1.1 Work requirements are identified from request/work orders or equivalent and clarified/confirmed with appropriate parties or by site inspection
	1.2 Occupational Health and Safety standards, statutory requirements, relevant Australian standards, codes of practice, manufacturers' specifications, environmental requirements and enterprise procedures are identified, applied and monitored throughout the work procedure
	1.3 Resources required to satisfy the work plan are identified, obtained and inspected for compliance with the job specifications
	1.4 Relevant plans, drawings and texts are selected and interpreted in accordance with the work plan
	1.5 Correct size, type and quantity of materials/components are determined, obtained and inspected for compliance with the job specifications

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ELEMENT	PERFORMANCE CRITERIA	
	1.6	Work is planned in detail including sequencing and prioritising and considerations made, where appropriate, for the maintenance of plant security and capacity in accordance with system/site requirements
	1.7	Coordination requirements, including requests for isolations where appropriate, are resolved with others involved, affected or required by the work
	1.8	Potential hazards are identified and prevention and/or control measures are selected in accordance with the work plan and site procedures
	1.9	Work area is prepared in accordance with work requirements and site procedures
	1.10	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2 Carry out modification	2.1	Required isolations are confirmed where appropriate in accordance with site requirements
	2.2	Equipment is modified using appropriate plans, drawings and text in accordance with the work plan
	2.3	Equipment is modified in conjunction with others involved in or affected by the work in accordance with the work plan
	2.4	Modifications are carried out mindful of effects on, or unnecessary loss of, other equipment in accordance with the work plan
	2.5	Modified equipment is set up to suit operational requirements and in accordance with manufacturer specifications and the work plan
	2.6	Final job inspection is performed and permits relinquished as required in accordance with the work plan

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ELEMENT	PERFORMANCE CRITERIA	
3 Complete the work	3.1	Work is completed and appropriate personnel notified in accordance with site/enterprise requirements
	3.2	Work area is cleared of waste, cleaned, restored and secured in accordance with site/enterprise procedures
	3.3	Plant, tools and equipment are maintained and stored in accordance with site/enterprise procedures
	3.4	Work completion details are finalised in accordance with site/enterprise procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the Essential Skills and Knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired modifying complex instrumentation equipment.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PM 428B Modify complex instrumentation equipment

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant Environmental, Occupational Health and Safety legislation and regulations
- Relevant plant and equipment, its location and operation
- Technical drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Relevant state and territory regulations
- Instrumentation principles and practices
- Relevant Australian standards
- Equipment and material required to perform the work
- Isolation procedures
- General layout of plant/work site and operation of its equipment

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REQUIRED SKILLS AND KNOWLEDGE

- Modification techniques
- Regulatory aspects
- Electrical fundamentals
- Test and measurement instruments
- Engineering and workshop practice
- Distributed control systems
- Programmable logic controller

T2 Specific skills needed to achieve the Performance Criteria:

- Apply Relevant Environmental, Occupational Health and Safety legislation and regulations
- Interpret Technical drawings and manufacturers manuals
- Apply relevant state and territory regulations
- Apply instrumentation principles and practices
- Follow relevant statutory regulations and codes of practice
- Apply relevant Australian standards
- Modify instrumentation equipment
- Use tools and relevant equipment
- Use test and measurement instruments
- Identify and select materials for the job
- Apply regulatory aspects
- Apply electrical fundamentals
- Carry out work completion details
- Communicate effectively
- Apply data analysis techniques and tools.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

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Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also

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comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement OH&S workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Where appropriate, attainment of an appropriate electrical licence, deeming competency associated with electrical work
  - Preparation and planning of work
  - Modification techniques and procedures
  - Completion of work procedures
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

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Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

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Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Inspection should be planned with the appropriate parties to determine access, conditions and work requirements.

Equipment may include CO2, H2, pH, dissolved O2, conductivity and optical density analysers, recorders, nuclear devices, smart transmitters, magflow meters, coal feeders, belt weigher, PLC's, ultrasonic sensors, hydraulic control equipment, turbine supervisory equipment, detectors, test equipment, transducers, pneumatic controllers, fire panels, T/C converters, electronic controllers, wear monitors, printers, printer circuit boards, UV sterilisation equipment, gas detection equipment and surge suppression equipment.

Materials may include lubricants, cleaning solvents, gasket materials and leak test solution.

Components may include gas analyser, sensing elements, liquid analyser sensing elements, columns, thermal/conductive detectors, infra-red sources, filters, chopper motors, balancing motors, servo motors, chart drives, relays, load cells, tachometers, PLC input/output blocks, amplifying modules, servo valves and plug- in PCBs.

Test and measurement instruments may include multimeter, standard gases, decade box, d.c., I/V standard, potentiometer, radiation meter, hand-held communicator/programmer, frequency counter, frequency generator, CRO, variac and specialised test equipment.

Work completion details may include plant and maintenance records, job cards, check sheets and on device labelling updates.

Work site environment may be affected by nearby plant or processes, e.g. heat, noise, dust, oil, water and chemical.

Isolations can refer to electrical/mechanical or other associated processes.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

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Competency Field

Competency Field **11)**

Maintenance.

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UEPMNT429B Modify electronic instrumentation equipment

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to conduct modification of electronic equipment including, but not limited to, process control instrumentation, power grid energy control, supervisory instrumentation, security equipment (CCTV).

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
UEPMNT356B	Maintain instrumentation equipment
UEENEEI001B	Install and set up transducers and sensing devices
UEENEEE002B	Dismantle, assemble and fabricate electrotechnology components
UEENEEE005B	Fix and secure equipment
UEENEEE007B	Use drawings, diagrams, schedules and manuals

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 4 Writing 4 Numeracy 4

Employability Skills Information

Employability Skills **5)**

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Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and prepare for the work	1.1 Work requirements are identified from request/work orders or equivalent and clarified/confirmed with appropriate parties or by site inspection
	1.2 Occupational Health and Safety standards, statutory requirements, relevant Australian standards, codes of practice, manufacturers' specifications, environmental requirements and enterprise procedures are identified, applied and monitored throughout the work procedure
	1.3 Resources required to satisfy the work plan are identified, obtained and inspected for compliance with the job specifications
	1.4 Relevant plans, drawings and texts are selected and interpreted in accordance with the work plan
	1.5 Correct size, type and quantity of materials/components are determined, obtained and inspected for compliance with the job specifications

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ELEMENT	PERFORMANCE CRITERIA	
	1.6	Work is planned in detail including sequencing and prioritising and considerations made where appropriate for the maintenance of plant security and capacity in accordance with system/site requirements
	1.7	Coordination requirements, including requests for isolations where appropriate, are resolved with others involved, affected or required by the work
	1.8	Potential hazards are identified and prevention and/or control measures are selected in accordance with the work plan and site procedures.
	1.9	Work area is prepared in accordance with work requirements and site procedures
	1.10	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2 Carry out modification	2.1	Required isolations are confirmed where appropriate in accordance with site requirements
	2.2	Equipment is modified using appropriate plans, drawings and text in accordance with the work plan
	2.3	Equipment is modified in conjunction with others involved in, or affected by, the work in accordance with the work plan
	2.4	Modifications are carried out mindful of effects on, or unnecessary loss of, other equipment in accordance with the work plan
	2.5	Modified equipment is set up to suit operational requirements and in accordance with manufacturer specifications and the work plan
	2.6	Final job inspection is performed and permits relinquished as required in accordance with the work plan.

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ELEMENT	PERFORMANCE CRITERIA	
3 Complete the work	3.1	Work is completed and appropriate personnel notified in accordance with site/enterprise requirements
	3.2	Work area is cleared of waste, cleaned, restored and secured in accordance with site/enterprise procedures
	3.3	Plant, tools and equipment are maintained and stored in accordance with site/enterprise procedures
	3.4	Work completion details are finalised in accordance with site/enterprise procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the Essential Skills and Knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired modifying electronic instrumentation equipment.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PM429B Modify electronic instrumentation equipment

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant Environmental, Occupational Health and Safety legislation and regulations
- Relevant plant and equipment, its location and operation
- Technical drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Relevant state and territory regulations
- Instrumentation principles and practices
- Instrument calibration techniques
- Electronic principles
- Relevant Australian standards
- Equipment and material required to perform the work

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REQUIRED SKILLS AND KNOWLEDGE

- Isolation procedures
- Modification techniques
- Regulatory aspects
- Electrical fundamentals
- Test and measurement instruments
- Engineering and electronic workshop practice
- Distributed control systems
- Programmable logic controller

T2 Specific skills needed to achieve the Performance Criteria:

- Apply Relevant Environmental, Occupational Health and Safety legislation and regulations
- Interpret Technical drawings and manufacturers manuals
- Apply relevant state and territory regulations
- Apply electronic principles
- Apply instrumentation principles and practices
- Apply instrument calibration techniques
- Follow relevant statutory regulations and codes of practice
- Apply relevant Australian standards
- Modify instrumentation equipment
- Use tools and relevant equipment
- Use test and measurement instruments
- Identify and select materials for the job
- Apply regulatory aspects theory
- Apply electrical fundamentals theory
- Carry out work completion details
- Communicate effectively
- Apply data analysis techniques and tools.
- Applying engineering and electronic workshop practices.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

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Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or in a realistically simulated work environment. In some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit **9.2)**

Before the critical aspects of evidence are considered all pre-requisites shall be met.

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Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement OH&S workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The knowledge and application of relevant sections of: OH&S legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Where appropriate, attainment of an appropriate electrical licence, deeming competency associated with electrical work
  - Preparation and planning of work
  - Modification techniques and procedures
  - Completion of work procedures
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

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- OHS policy and work procedures and instructions
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

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Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Inspection should be planned with the appropriate parties to determine access, conditions and work requirements.

Equipment may include analysers, recorders, nuclear devices, fire panels, T/C converters, electronic controllers, smart transmitters, coal feeders, belt weighers, PLC's, ultrasonic sensors, turbine/compressor supervisory equipment, combustion control equipment, wear monitors, water ingress protection equipment, printers, compressor surge control equipment, fuel governor equipment, gas detection panels and temperature monitoring equipment.

Materials may include cables, solder/flux, lubricants, cleaning solvents, contact cleaners, connectors, adhesive and sealants.

Components may include power supplies, relays, analysing sensor elements, load cells, PLC input/output blocks, printed circuit boards, protection devices, switches, diodes, transistors, SCR's, triacs, diacs, LEDs, integrated circuits, resistors, capacitors, inductors and transformers.

Test and measurement instruments may refer to multimeter, decade box, d.c. I/V standard, potentiometer, radiation meter, hand-held communicator/programmer, frequency counter, CRO, function generator, LCR bridge, logic analyser and specialised test equipment.

Work completion details may include plant and maintenance records, job cards, check sheets and on device labelling updates.

Work site environment may be affected by nearby plant or processes, e.g. heat, noise, dust, oil, water and chemical.

Isolations can refer to electrical/mechanical or process.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

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Competency Field

Competency Field **11)**

Maintenance.

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UEPMNT430B Test and commission complex instrumentation equipment

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to conduct testing and commissioning of complex instrumentation used in "multi-loop" configuration, including, but not limited to signal characterising equipment, totaliser units, microprocessor control equipment, interface equipment, laboratory and field analysers, ultra-sonic and nucleonics equipment.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit may require an electrical licence to practise in the workplace.

Practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
UEPMNT359B	Test and Commission Instrumentation Systems
UEENEEI001B	Install and set up transducers and sensing devices
UEENEEE002B	Dismantle, assemble and fabricate electrotechnology components
UEENEEE005B	Fix and secure equipment
UEENEEE007B	Use drawings, diagrams, schedules and manuals

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 4 Writing 4 Numeracy 4

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Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and prepare for the work	1.1 Work requirements are identified from request/work orders or equivalent and clarified/confirmed with appropriate parties or by site inspection
	1.2 Occupational Health and Safety standards, statutory requirements, relevant Australian standards, codes of practice, manufacturers' specifications, environmental requirements and enterprise procedures are identified, applied and monitored throughout the work procedure.
	1.3 Resources required to satisfy the work plan are identified, obtained and inspected for compliance with the job specifications
	1.4 Relevant plans, drawings and texts are selected and interpreted in accordance with the work plan
	1.5 Correct size, type and quantity of materials/components are determined, obtained and inspected for compliance with the job

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ELEMENT	PERFORMANCE CRITERIA	
		specifications
	1.6	Work is planned in detail including sequencing and prioritising and considerations made, where appropriate, for the maintenance of plant security and capacity in accordance with system/site requirements
	1.7	Coordination requirements, including requests for isolations where appropriate, are resolved with others involved, affected or required by the work
	1.8	Potential hazards are identified and prevention and/or control measures are selected in accordance with the work plan and site procedures
	1.9	Work area is prepared in accordance with work requirements and site procedures
	1.10	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2 Test wiring systems	2.1	Required isolations are confirmed where appropriate in accordance with site requirements
	2.2	Wiring systems are tested using appropriate plans, drawings and texts in accordance with the work plan
	2.3	Wiring systems are tested in conjunction with others involved in, or affected by, the work in accordance with the work plan
	2.4	Wiring systems, including enclosures/supports, are inspected prior to testing to ensure absence of any damage, defects and/or signs of deterioration in accordance with the work plan
	2.5	Fixed wiring is tested as appropriate and results/observations are interpreted and documented to confirm compliance with job specifications

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ELEMENT	PERFORMANCE CRITERIA
3 Test piping and tubing systems	3.1 Required isolations are confirmed where appropriate in accordance with site requirements
	3.2 Piping and tubing systems are tested using appropriate plans, drawings and texts in accordance with the work plan
	3.3 Piping and tubing systems are tested in conjunction with others involved in, or affected by, the work in accordance with the work plan
	3.4 Piping and tubing systems, including enclosures/supports, are inspected prior to testing to ensure absence of any damage, defects and/or signs of deterioration in accordance with the work plan
	3.5 Fixed piping and tubing is tested as appropriate and results/observations are interpreted and documented to confirm compliance with job specifications and the work plan
4 Test the equipment	4.1 Required isolations are confirmed where appropriate in accordance with site requirements
	4.2 Equipment is tested using appropriate plans, drawings and texts in accordance with the work plan
	4.3 Equipment is tested in conjunction with others involved in, or affected by, the work in accordance with the work plan
	4.4 Required test conditions are confirmed and the equipment is inspected to ensure absence of any damage, defects and/or signs of deterioration in accordance with the work plan
	4.5 Equipment is tested using appropriate test techniques in accordance with the work plan
	4.6 Equipment test results/observations are interpreted and documented to confirm compliance with job specifications
5 Commission the equipment	5.1 Required isolations are confirmed where appropriate in accordance with site requirements

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ELEMENT	PERFORMANCE CRITERIA	
	5.2	Equipment is commissioned using appropriate plans, drawings and texts in accordance with the work plan
	5.3	Equipment is commissioned in conjunction with others involved in, or affected by, the work in accordance with the work plan
	5.4	Equipment is set up in accordance with operational requirements/manufacturer specifications
	5.5	Testing and monitoring procedures are followed and results monitored, interpreted and documented to ensure equipment operates/functions within specifications
	5.6	Equipment is commissioned with due regard being paid to plant security and capacity in accordance with the work plan

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the Essential Skills and Knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired testing and commissioning complex instrumentation equipment.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PM430B Test and commission complex instrumentation equipment

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant Environmental, Occupational Health and Safety legislation and regulations
- Relevant plant and equipment, its location and operation
- Technical drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant

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REQUIRED SKILLS AND KNOWLEDGE

- Relevant state and territory regulations
- Instrumentation principles and practices
- Instrument calibration techniques
- Relevant Australian standards
- Equipment and material required to perform the work
- Isolation procedures
- Testing and commissioning procedures and techniques
- Operational requirements of the equipment
- Complex instrument equipment
- Regulatory aspects
- Electrical fundamentals
- Test and measurement instruments
- Distributed control systems
- Programmable logic controller

T2 Specific skills needed to achieve the Performance Criteria:

- Apply Relevant Environmental, Occupational Health and Safety legislation and regulations
- Interpret Technical drawings and manufacturers manuals
- Apply relevant state and territory regulations
- Apply instrumentation principles and practices
- Apply instrument calibration techniques
- Apply relevant Australian standards
- Use tools and relevant equipment
- Use test and measurement instruments
- Inspect and test the wiring systems
- Inspect and test piping and tubing systems
- Inspect, test and monitor equipment
- Commission the equipment
- Identify and select materials for the job
- Apply electrical fundamentals theory
- Carry out work completion details
- Carry out work completion details
- Communicate effectively
- Apply data analysis techniques and tools.

Evidence Guide

EVIDENCE GUIDE

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EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

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Critical aspects of evidence required to demonstrate competency in this unit **9.2)**

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Where appropriate, attainment of an appropriate electrical licence, deeming competency associated with electrical work
  - Preparation and planning of work
  - Testing techniques
  - Commissioning techniques and procedures
  - Completion of work procedures
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions

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incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment

9.4)

This unit shall be assessed by methods given in 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

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Concurrent assessment and relationship with other units	**9.5)**
	There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.
	Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Inspection should be planned with the appropriate parties to determine access, conditions and work requirements.

Equipment may include CO2, H2, pH, dissolved O2, conductivity and optical density analysers, recorders, nuclear devices, smart transmitters, magflow meters, coal feeders, belt weigher, PLCs, ultrasonic sensors, hydraulic control equipment, turbine supervisory equipment, detectors, test equipment, transducers, pneumatic controllers, fire panels, T/C converters, electronic controllers, wear monitors, printers, printer circuit boards, UV sterilisation equipment, gas detection equipment and surge suppression equipment.

Wiring systems can refer to cords and cables such as flexible multi-core, thermocouple, coaxial, ribbon and hook up cable, signal and data cable, ducts such as PVC and metal, trunking, conduits and fittings such as PVC and metal (rigid and flexible) pipes, elbows, bends, tees, junction boxes, hose terminators, saddles, spacers, bushes, adaptors and locknuts, wire loom support, cable ties, unistrut, trays and ladder racks.

Piping and tubing systems may refer to piping/tubing, piping/tubing enclosures, fittings and support systems.

Components may include gas analyser, sensing elements, liquid analyser sensing elements, columns, thermal/conductive detectors, infra-red sources, filters, chopper motors, balancing motors, servo motors, chart drives, relays, load cells, tachometers, PLC input/output blocks, amplifying modules, servo valves and plug-in PCBs.

Test and measurement instruments may include multimeter, standard gases, decade box, d.c., I/V standard, potentiometer, radiation meter, hand-held communicator/programmer, frequency counter, frequency generator, CRO, variac and

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RANGE STATEMENT

specialised test equipment.

Fixed wiring tests can refer to polarity, loop impedance and continuity.

Fixed piping and tubing tests can refer to leak and continuity.

Monitoring equipment can refer to test recorder/data logger.

Work may be performed with equipment on-line.

Work completion details may include plant and maintenance records, job cards, check sheets and on device labelling updates.

Work site environment may be affected by nearby plant or processes, e.g. heat, noise, dust, oil, water and chemical.

Isolations can refer to electrical/mechanical or other associated processes.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Maintenance.

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UEPMNT431B Test and commission electronic instrumentation equipment

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to conduct testing and commissioning of electronic wiring systems and complex digital/analogue equipment including, but not limited to, process control instrumentation, power grid energy control, supervisory instrumentation, security equipment (CCTV).

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit may require an electrical licence to practise in the workplace.

Practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
UEPMNT359B	Test and Commission Instrumentation Systems
UEENEEI001B	Install and set up transducers and sensing devices
UEENEEE002B	Dismantle, assemble and fabricate electrotechnology components
UEENEEE005B	Fix and secure equipment
UEENEEE007B	Use drawings, diagrams, schedules and manuals

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 4 Writing 4 Numeracy 4

Employability Skills Information

Employability Skills **5)**

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Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and prepare for the work	1.1 Work requirements are identified from request/work orders or equivalent and clarified/confirmed with appropriate parties or by site inspection
	1.2 Occupational Health and Safety standards, statutory requirements, relevant Australian standards, codes of practice, manufacturers' specifications, environmental requirements and enterprise procedures are identified, applied and monitored throughout the work procedure
	1.3 Resources required to satisfy the work plan are identified, obtained and inspected for compliance with the job specifications
	1.4 Relevant plans, drawings and texts are selected and interpreted in accordance with the work plan
	1.5 Correct size, type and quantity of materials/components are determined, obtained and inspected for compliance with the job specifications

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ELEMENT		PERFORMANCE CRITERIA	
		1.6	Work is planned in detail including sequencing and prioritising and considerations made, where appropriate, for the maintenance of plant security and capacity in accordance with system/site requirements
		1.7	Coordination requirements, including requests for isolations where appropriate, are resolved with others involved, affected or required by the work
		1.8	Potential hazards are identified and prevention and/or control measures are selected in accordance with the work plan and site procedures
		1.9	Work area is prepared in accordance with work requirements and site procedures
		1.10	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2	Test wiring systems	2.1	Required isolations are confirmed where appropriate in accordance with site requirements
		2.2	Wiring systems are tested using appropriate plans, drawings and texts in accordance with the work plan
		2.3	Wiring systems are tested in conjunction with others involved in, or affected by, the work in accordance with the work plan
		2.4	Wiring systems, including enclosures/ supports, are inspected prior to testing to ensure absence of any damage, defects and/or signs of deterioration in accordance with the work plan
		2.5	Fixed wiring is tested as appropriate and results/observations are interpreted and documented to confirm compliance with job specifications.
3	Test piping and tubing systems	3.1	Required isolations are confirmed where appropriate in accordance with site requirements

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ELEMENT	PERFORMANCE CRITERIA	
	3.2	Piping and tubing systems are tested using appropriate plans, drawings and texts in accordance with the work plan
	3.3	Piping and tubing systems are tested in conjunction with other involved in, or affected by, the work in accordance with the work plan
	3.4	Piping and tubing systems, including enclosures/supports, are inspected prior to testing to ensure absence of any damage, defects and/or signs of deterioration in accordance with the work plan
	3.5	Fixed piping and tubing is tested as appropriate and results/observations are interpreted and documented to confirm compliance with job specifications and the work plan
4 Test the equipment	4.1	Required isolations are confirmed where appropriate in accordance with site requirements
	4.2	Equipment is tested using appropriate plans, drawings and texts in accordance with the work plan
	4.3	Equipment is tested in conjunction with others involved in, or affected by, the work in accordance with the work plan
	4.4	Required test conditions are confirmed and the equipment is inspected to ensure absence of any damage, defects and/or signs of deterioration in accordance with the work plan
	4.5	Equipment is tested using appropriate test techniques in accordance with the work plan
	4.6	Equipment test results/observations are interpreted and documented to confirm compliance with job specifications
5 Commission the equipment	5.1	Required isolations are confirmed where appropriate in accordance with site requirements
	5.2	Equipment is commissioned using appropriate plans, drawings and texts in accordance with the

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ELEMENT	PERFORMANCE CRITERIA	
		work plan
	5.3	Equipment is commissioned in conjunction with others involved in, or affected by, the work in accordance with the work plan
	5.4	Equipment is set up in accordance with operational requirements/manufacturer specifications
	5.5	Testing and monitoring procedures are followed and results monitored, interpreted and documented to ensure equipment operates/functions within specifications
	5.6	Equipment is commissioned with due regard being paid to plant security and capacity in accordance with the work plan
	5.7	Final job inspection is carried out and permits relinquished as required in accordance with the work plan
6 Complete the work	6.1	Work is completed and appropriate personnel notified in accordance with site/enterprise requirements
	6.2	Work area is cleared of waste, cleaned, restored and secured in accordance with site/enterprise procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the Essential Skills and Knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired testing and commissioning electronic instrumentation equipment.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PM431B Test and commission electronic instrumentation equipment

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REQUIRED SKILLS AND KNOWLEDGE

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant Environmental, Occupational Health and Safety legislation and regulations
- Relevant plant and equipment, its location and operation
- Technical drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Relevant state and territory regulations
- Instrumentation principles and practices
- Instrument calibration techniques
- Electronic principles
- Relevant Australian standards
- Equipment and material required to perform the work
- Isolation procedures
- Testing and commissioning procedures and techniques
- Operational requirements of the equipment
- Electronic instrumentation equipment
- Electrical fundamentals
- Electronic workshop practices
- Test and measurement instruments
- Distributed control systems
- Programmable logic controller

T2 Specific skills needed to achieve the Performance Criteria:

- Apply Relevant Environmental, Occupational Health and Safety legislation and regulations
- Interpret Technical drawings and manufacturers manuals
- Apply relevant state and territory regulations
- Apply electronic principles
- Apply instrumentation principles and practices
- Apply instrument calibration techniques
- Apply relevant Australian standards
- Use tools and relevant equipment
- Use test and measurement instruments
- Inspect and test the wiring systems;
- Inspect and test piping and tubing systems;
- Inspect, test and monitor equipment
- Commission the equipment; Identify and select materials for the job
- Apply regulatory aspects
- Apply electrical fundamentals

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REQUIRED SKILLS AND KNOWLEDGE

- Carry out work completion details
- Communicate effectively
- Apply data analysis techniques and tools
- Apply electronic workshop practices

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

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Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures;

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Enterprise/site emergency procedures

- Preparation and planning of work
- Testing techniques
- Commissioning techniques and procedures
- Completion of work procedures associated with electrical work
- Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment

9.4)

This unit shall be assessed by methods given in 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is

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expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Inspection should be planned with the appropriate parties to determine access, conditions and work requirements.

Equipment may include analysers, recorders, nuclear devices, fire panels, T/C converters, electronic controllers, smart transmitters, coal feeders, belt weighers, PLCs, ultrasonic sensors, turbine/compressor supervisory equipment, combustion control equipment, wear monitors, water ingress protection equipment, printers, compressor surge control equipment, fuel governor equipment, gas detection panels and temperature monitoring equipment.

Wiring systems can refer to cords and cables such as flexible multi-core, thermocouple, coaxial, ribbon and hook up cable, signal and data cable, ducts such as PVC and metal, trunking, conduits and fittings such as PVC and metal (rigid and flexible) pipes, elbows, bends, tees, junction boxes, hose terminators, saddles, spacers, bushes, adaptors and locknuts, wire loom support, cable ties, unistrut, trays and ladder racks.

Piping and tubing systems may refer to piping/tubing, piping/tubing enclosures, fittings and support systems.

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RANGE STATEMENT

Components may include power supplies, relays, analysing sensor elements, load cells, PLC input/output blocks, printed circuit boards, protection devices, switches, diodes, transistors, SCR's, triacs, diacs, LEDs, integrated circuits, resistors, capacitors, inductors and transformers.

Test and measurement instruments may include multimeter, standard gases, decade box, d.c., I/V standard, potentiometer, radiation meter, hand-held communicator/programmer, frequency counter, function generator, CRO, LCR bridge, logic analyser and specialised test equipment.

Fixed wiring tests can refer to polarity, loop impedance and continuity.

Fixed piping and tubing tests can refer to leak and continuity.

Monitoring equipment can refer to test recorder/data logger.

Work may be performed with equipment on line.

Work completion details may include plant and maintenance records, job cards, check sheets and on device labelling updates.

Work site environment may be affected by nearby plant or processes, e.g. heat, noise, dust, oil, water and chemical.

Isolations can refer to electrical/mechanical or other associated processes.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Maintenance.

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UEPMNT432B Write programs for control systems

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to undertake the writing of programs from flow charts for electronic control systems.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

Pre-Requisites

Prerequisite Unit(s) **4)**

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Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
UEPMNT351B	Test and commission electrical equipment
UEENEEG108A	Trouble-shoot and repair faults in low voltage electrical apparatus and circuits
UEENEEE101A	Apply Occupational Health Safety regulations, codes and practices in the workplace
UEENEEE102A	Fabricate, dismantle, assemble of utilities industry components
UEENEEE104A	Solve problems in d.c. circuits
UEENEEE105A	Fix and secure electrotechnology equipment
UEENEEE107A	Use drawings, diagrams, schedules, standards, cords and specifications
UEENEEG006A	Solve problems in single and three phase low voltage machines
UEENEEG033A	Solve problems in single and three phase low voltage electrical apparatus and circuits
UEENEEG063A	Arrange circuits, control and protection for general electrical installations
UEENEEG101A	Solve problems in electromagnetic

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Prerequisite Unit(s) **4)**

	devices and related circuits
UEENEEG102A	Solve problems in low voltage a.c. circuits
UEENEEG106A	Terminate cables, cords and accessories for low voltage circuits

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 4 Writing 4 Numeracy 4

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and prepare for the work	1.1 Work requirements are identified from request/work orders or equivalent and clarified/confirmed with appropriate parties or by site inspection
	1.2 Occupational Health and Safety standards, statutory requirements, relevant Australian standards, codes of practice, manufacturers' specifications, environmental requirements and enterprise procedures are identified, applied and monitored throughout the work procedure
	1.3 Resources required to satisfy the work plan are identified, obtained and inspected for compliance with the job specifications
	1.4 Relevant plans, drawings and texts are selected and interpreted in accordance with the work plan
	1.5 Work is planned in detail including sequencing, prioritising and considerations made where appropriate for the maintenance of plant security and capacity in accordance with system/site requirements
	1.6 Coordination requirements, including requests for isolations where appropriate, are resolved with others involved, affected or required by the work
	1.7 Potential hazards are identified and prevention and/or control measures are selected in accordance with the work plan and site procedures
	1.8 Work area is prepared in accordance with work requirements and site procedures
	1.9 Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2 Write and load	2.1 Test and measurement instruments, software packages are selected and used to enable

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ELEMENT	PERFORMANCE CRITERIA	
programs		completion of the program writing in accordance with the work plan
	2.2	Appropriate plans, drawings and text are selected to enable program writing for the control system in accordance with the work plan
	2.3	Programming data is written with sequence and variables determined as being in accordance with the desired operating parameters of the control system
	2.4	Test and measurement instruments, software packages are selected and used to enable the program to be loaded in accordance with the work plan
3 Test operating parameters	3.1	Test and measurement instruments, software packages to allow the testing of operating parameters are selected and used in accordance with the work plan
	3.2	Appropriate plans, drawings and text and the written program are used to confirm programming data in accordance with the work plan
	3.3	Sequence and variables are tested to confirm the desired operating parameters of the control system are met
4 Complete the work	4.1	Documentation of the programming is performed and presented to appropriate personnel in accordance with the work plan
	4.2	Work procedures are modified and evaluated where necessary in accordance with new program documentation
	4.3	Work is completed and appropriate personnel notified in accordance with site/enterprise requirements

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the Essential Skills and Knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired writing programs for control systems.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PM432B Write programs for control systems

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant Environmental, Occupational Health and Safety legislation and regulations
- Relevant plant and equipment, its location and operation
- Technical drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Relevant Australian standards
- Equipment and material required to perform the work
- Performance and function of the system
- Test and measurement instruments
- Programming
- Distributed control systems
- Programmable logic controller
- Software packages

T2 Specific skills needed to achieve the Performance Criteria:

- Relevant Environmental, Occupational Health and Safety legislation and regulations
- Relevant plant and equipment, its location and operation
- Technical drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Apply relevant Australian standards
- Locate and interpret software packages
- Write programmes
- Load programmes
- Use test and measurement instruments
- Carry out documentation
- Communicate effectively
- Apply data analysis techniques and tools.

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Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment

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instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Preparation and planning of work
  - Writing and loading programmes
  - Testing of operating parameters
  - Completion of work procedures
  - Dealing with an unplanned event by drawing on essential

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knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment

9.4)

This unit shall be assessed by methods given in 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

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Concurrent assessment and relationship with other units **9.5)**

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Control system can refer to a combination of equipment such as programmable controllers PLCs and distributive control systems.

Programming data can refer to programs written in machine code, assembled and compiled language levels.

Text can refer top manufacturer specifications and instruction sets, programming flow charts, complete DOS reference manuals and software programming/interfacing sheets.

Test and measurement instruments may refer to a cathode ray oscilloscope, logic analyser and Laptop computer

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

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Competency Field 11)

Maintenance.

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UEPMNT433B Conduct routine generator electrical maintenance

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to undertake those routine maintenance tasks of an electrical generating set.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to occupational health and safety.

Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

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Prerequisite Unit(s) **4)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
UEPMNT346B	Maintain electrical equipment
UEENEEG108A	Trouble-shoot and repair faults in low voltage electrical apparatus and circuits
UEENEEE101A	Apply Occupational Health Safety regulations, codes and practices in the workplace
UEENEEE102A	Fabricate, dismantle, assemble of utilities industry components
UEENEEE104A	Solve problems in d.c. circuits
UEENEEE105A	Fix and secure electrotechnology equipment
UEENEEE107A	Use drawings, diagrams, schedules, standards, cords and specifications
UEENEEG006A	Solve problems in single and three phase low voltage machines
UEENEEG033A	Solve problems in single and three phase low voltage electrical apparatus and circuits
UEENEEG063A	Arrange circuits, control and protection for general electrical installations
UEENEEG101A	Solve problems in electromagnetic devices and related circuits
UEENEEG102A	Solve problems in low voltage a.c.

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Prerequisite Unit(s) **4)**

	circuits
UEENEEG106A	Terminate cables, cords and accessories for low voltage circuits

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 4 Writing 4 Numeracy 4

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT **PERFORMANCE CRITERIA**

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ELEMENT	PERFORMANCE CRITERIA	
1 Plan and prepare for the work	1.1	Work requirements are identified from request/work orders or equivalent and clarified/confirmed with appropriate parties or by site inspection
	1.2	Occupational Health and Safety standards, statutory requirements, relevant Australian standards, codes of practice, manufacturers' specifications, environmental requirements and enterprise procedures are identified, applied and monitored throughout the work procedure
	1.3	Resources required to satisfy the work plan are identified, obtained and inspected for compliance with the job specifications
	1.4	Relevant plans, drawings and texts are selected and interpreted in accordance with the work plan
	1.5	Correct size, type and quantity of materials/components are determined, obtained and inspected for compliance with the job specifications
	1.6	Work is planned in detail including sequencing and prioritising and considerations made, where appropriate, for the maintenance of plant security and capacity in accordance with system/site requirements
	1.7	Co-ordination requirements, including requests for isolations where appropriate, are resolved with others involved, affected or required by the work
	1.8	Potential hazards are identified and prevention and/or control measures are selected in accordance with the work plan and site procedures
	1.9	Work area is prepared in accordance with work requirements and site procedures
	1.10	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training

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ELEMENT	PERFORMANCE CRITERIA
2 Carry out routine generator maintenance	2.1 Required isolations are confirmed where appropriate in accordance with site requirements
	2.2 Generator is maintained using appropriate plans, drawings and texts in accordance with the work plan
	2.3 Generator is maintained in conjunction with others involved in, or affected by, the work in accordance with the work plan
	2.4 Final job inspection is carried out and permits relinquished in accordance with the work plan
.3 Complete the work	3.1 Work is completed and appropriate personnel notified in accordance with site/enterprise requirements
	3.2 Work area is cleared of waste, cleaned, restored and secured in accordance with site/enterprise procedures
	3.3 Plant, tools and equipment are maintained and stored in accordance with site/enterprise procedures
	3.4 Work completion details are finalised in accordance with site/enterprise procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the Essential Skills and Knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired conducting routine generator electrical maintenance.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PM433B Routine generator electrical maintenance

T1 Evidence shall show that knowledge has been acquired for safe working practices

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REQUIRED SKILLS AND KNOWLEDGE

of:

- Relevant Environmental, Occupational Health and Safety legislation and regulations
- Relevant plant and equipment, its location and operation
- Technical drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Relevant state and territory regulations
- Relevant Australian standards
- Equipment and material required to perform the work
- Generator types and characteristics
- Generator support systems
- Isolation and Permit procedures
- Maintenance techniques
- Electrical equipment
- Regulatory procedures
- Test and measurement instruments;
- Engineering and workshop practice

T2 Specific skills needed to achieve the Performance Criteria:

- Relevant Environmental, Occupational Health and Safety legislation and regulations
- Relevant plant and equipment, its location and operation
- Technical drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Relevant state and territory regulations
- Apply relevant Australian standards
- Use tools and relevant equipment
- Use test and measurement instruments
- Use maintenance procedures
- Select materials for the job
- Apply regulatory procedures
- Apply data analysis techniques and tools
- Communicate effectively

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of

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EVIDENCE GUIDE

unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment 9.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence 9.2)

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required to demonstrate competency in this unit

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Preparation and planning of work
  - Maintenance techniques and procedures
  - Completion of work procedures
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for **9.3)**

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assessment

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of

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learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Details of maintenance may be clarified by diagnosis and/or workplace inspection.

Maintenance may include excitation and brush gear inspection, shaft earthing, cooling systems and cleaning of coolers and filters etc.

Work completion details may include plant and maintenance records, job cards, check sheets and on device labelling updates.

Work site environment may be affected by nearby plant or processes, e.g. heat, noise, dust, oil, water and chemical.

Isolations can refer to electrical/mechanical or other associated processes.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Maintenance.

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UEPMNT434A Diagnose and Repair Faults in Wind Turbine Control Systems

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to diagnose and repair faults in wind turbine control systems and associated accessories and wiring systems.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit may require an electrical licence to practise in the workplace.

Practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
UEPMNT362A	Maintain Wind Turbine Control Systems
UEENEEG108A	Trouble-shoot and repair faults in low voltage electrical apparatus and circuits
UEENEEE101A	Apply Occupational Health Safety regulations, codes and practices in the workplace
UEENEEE102A	Fabricate, dismantle, assemble of utilities industry components
UEENEEE104A	Solve problems in d.c. circuits
UEENEEE105A	Fix and secure electrotechnology equipment
UEENEEE107A	Use drawings, diagrams, schedules, standards, cords and specifications
UEENEEG006A	Solve problems in single and three phase low voltage machines
UEENEEG033A	Solve problems in single and three phase low voltage electrical apparatus and circuits
UEENEEG063A	Arrange circuits, control and protection for general electrical installations

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Prerequisite Unit(s) **4)**

UEENEEG101A	Solve problems in electromagnetic devices and related circuits
UEENEEG102A	Solve problems in low voltage a.c. circuits
UEENEEG106A	Terminate cables, cords and accessories for low voltage circuits

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 4 Writing 4 Numeracy 4

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Plan and prepare the work	1.1	Work requirements are identified from work orders or equivalent and confirmed with appropriate parties or by site inspection.
	1.2	Occupational Health and Safety standards, statutory requirements, relevant Australian standards, codes of practice, manufacturers' specifications, environmental requirements and enterprise procedures are identified, applied and monitored throughout the work procedures.
	1.3	Resources required to satisfy the work plan are identified, obtained and inspected for compliance with the job specifications.
	1.4	Relevant plans, drawings and texts are selected and interpreted in accordance with the work plan.
	1.5	Correct size, type and quantity of materials and components are determined, obtained and inspected for compliance with the job specifications.
	1.6	Work is planned in detail including sequencing and prioritising and considerations made, where appropriate, for the maintenance of plant security and capacity in accordance with system/site requirements.
	1.7	Co-ordination requirements, including requests for isolations where appropriate, are resolved with others involved, affected or required by the work.
	1.8	Potential hazards are identified and control measures are implemented.
	1.9	Work area is prepared in accordance with work requirements and site procedures.
	1.10	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of on-the-job training.

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ELEMENT	PERFORMANCE CRITERIA	
2 Verify the fault	2.1	System function and principles are determined and understood by referring to drawings, circuit diagrams, flow charts, equipment manuals and expert personnel.
	2.2	Fault indicators, appropriate technical information, diagnostic techniques are used to verify reported symptoms or faults in accordance with the work plan.
	2.3	Symptoms are reproduced and monitored if practical, whilst due regard for personnel safety and plant security is observed in accordance with the work plan.
3 Find the fault	3.1	Required isolations are confirmed where appropriate in accordance with site requirements.
	3.2	Fault finding is carried out in conjunction with others involved in, or affected by, the work in accordance with enterprise/job requirements.
	3.3	Equipment components, wires, cables, terminations and support fixings are inspected for obvious faults in accordance with the work plan.
	3.4	All appropriate fault finding/diagnostic techniques are identified, selected and used to determine the fault in accordance with the work plan.
	3.5	Faulty system equipment/components are localised/isolated and the malfunction is confirmed by inspection and testing in accordance with site requirements and work plan.
	3.6	Test and measurement instruments are used in accordance with manufacturers' instructions.
4 Determine cause of fault	4.1	All appropriate personnel are consulted in order to obtain as many details relating to the faulty equipment as possible.
	4.2	System monitoring equipment, fault indicators and maintenance records reviewed in order to

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ELEMENT	PERFORMANCE CRITERIA	
		obtain as many details relating to the faulty equipment as possible.
	4.3	Valid conclusions about the nature and cause of the fault are reached from analysis of available evidence in accordance with the work plan.
5 Repair or rectify the fault	5.1	Required isolations are confirmed where appropriate in accordance with site requirements.
	5.2	Appropriate repair procedures are undertaken in conjunction with others involved in, or affected by, the work in accordance with the work plan.
	5.3	Faulty, worn, damaged or unsecured equipment/components are replaced, repaired or secured in accordance with the work plan.
	5.4	Equipment/components are selected and replaced as required in accordance with appropriate specifications and the work plan.
	5.5	Components disconnected for testing are reconnected having been proven free of faults and all terminations are then checked to ensure they are electrically and mechanically sound in accordance with the work plan.
	5.6	All faults are repaired or rectified in accordance with the work plan.
	5.7	Correct operation of the system is confirmed in accordance with site requirements and work plan.
	5.8	Final job inspection is performed and permits are relinquished as required in accordance with the work plan.
6 Complete the work	6.1	Work is completed and appropriate personnel notified in accordance with site/enterprise requirements.
	6.2	Work area is cleared of waste, cleaned, restored and secured in accordance with site/enterprise procedures.

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ELEMENT	PERFORMANCE CRITERIA
	6.3 Plant, tools and equipment are maintained and stored in accordance with site/enterprise procedures.
	6.4 Work completion details are finalised in accordance with site/enterprise procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the Essential Skills and Knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired diagnosing and repairing faults in wind turbine control systems.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PM434A Faults in Wind Turbine Control Systems

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant Environmental, Occupational Health and Safety legislation and regulations.
- Relevant plant and equipment, and its location.
- Technical drawings and manufacturers manuals.
- Introduction to and typical arrangements of wind farm power production plant.
- Relevant state and territory regulations.
- Relevant Australian standards.
- Equipment and material required to perform the work.
- Isolation procedures.
- Wind farm control systems principles and practices.
- Electronic principles and applications.
- Instrument calibration techniques.
- Wind farm control systems equipment.
- Generator control systems.
- Test and measurement of control system equipment.
- Testing and commissioning techniques and procedures.
- Operational requirements of the equipment.
- Electronic electrical equipment.
- Electrical principles.
- Test and measurement instruments.

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REQUIRED SKILLS AND KNOWLEDGE

- Engineering and electronic workshop practices.

T2 Specific skills needed to achieve the Performance Criteria:

- Interpret technical drawings and manufacturers manuals.
- Apply relevant state and territory regulations.
- Apply electronic principles.
- Apply relevant Australian standards.
- Use tools and relevant equipment.
- Use test and measurement instruments.
- Verify and identify faults.
- Use appropriate fault finding and diagnostic techniques.
- Determine the cause of faults.
- Repair faults.
- Identify and select materials for the job.
- Apply electrical fundamentals.
- Carry out work completion details.
- Apply distributed control system theory.
- Communicate effectively.
- Apply data analysis techniques and tools.
- Apply engineering and electronic workshop practices.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment	**9.1)**
	Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for

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apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all prerequisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:

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- Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
- Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
- Demonstrate an understanding of the essential knowledge and associated skills as described in 6) of this unit
- Demonstrate an appropriate level of employability skillsConduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures

- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The knowledge and application of relevant sections of Occupational Health and Safety legislation, statutory legislation, enterprise/site safety procedures; enterprise/site emergency procedures.
  - Preparation and planning of work; Verification techniques; Diagnostic and fault finding techniques and procedures associated with electrical work; Repair techniques and procedures; Completion of work procedures
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of

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work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment

9.4)

This unit shall be assessed by methods given in 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Inspection should be planned with the appropriate parties to determine access,

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RANGE STATEMENT

conditions and work requirements.

Wind farm control systems may include: generator excitation systems, inverter systems, speed control systems, rectifier systems, blade pitch systems, wind direction sensing systems and yaw control systems.

Wind farm control systems communication systems may include: TCP/IP network, ethernet, fibre optic, wireless, field bus, hart protocol, profibus, internet and hard wired.

Wind farm control systems may include one or a combination of: electronic systems, distributive control systems, SCADA, electrical systems, pneumatic systems, hydraulic systems, mechanical systems and PLC systems.

Equipment may include: circuit boards, circuit breakers, transformers, rectifiers, inverters, pressure gauges, electric motors, control cabinets, protection equipment, transmitters, switches, temperature sensors, indicators, meters, proximity probes, fire detectors, smoke detectors and vibration detectors, fibre optic cables, Category 5 cables, wireless transmitters and receivers.

Components may include: fuses, circuit breakers, timers, contactors, contacts, coils, relays, resistors, inductors, capacitors, bridge rectifiers, diodes, heat sinks, solenoids, overloads, plug in printed circuit boards, switches, plugs, cables and thermistors.

Fixed wiring tests can refer to: polarity, loop impedance, insulation resistance and continuity tests.

Materials may refer to: insulation tapes, heat shrink, sleeving, spiral binding, cable ties, solder, lubricants, oil, greases, sealants, lugs, connectors, terminal blocks, cable markers and identification labels.

Tools, equipment and test and measurement instruments may include: multimeter, decade box, d.c., I/V standard, potentiometer, radiation meter, hand-held communicator, frequency counter, frequency generator, CRO, variac, hand tools, power tools lifting equipment and specialised test equipment.

Fault find and diagnostic techniques may include: linear approach, half split rule, sensory detection/insulation/resistance and continuity test.

Fault indicators may include: self test systems, DCS logs, indication lamps, alarms and flag relays.

Work may be performed in service or out of service.

Work completion details may include: plant and maintenance records, job cards, check sheets and on device labelling updates.

Work site environment may be affected by nearby plant or processes, e.g. heat, noise, dust, oil, water height and chemicals.

Isolations can refer to electrical/mechanical or other associated processes.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information

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RANGE STATEMENT

and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Maintenance.

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UEPMNT435A Diagnose and Repair Faults in Wind Turbine Mechanical Systems

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to undertake the diagnosis and repair of wind turbine mechanical systems.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit may require an electrical licence to practise in the workplace.

Practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
UEPMNT361A	Maintain Wind Turbine Mechanical Systems

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 4 Writing 4 Numeracy 4

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

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Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and prepare the work.	1.1 Work requirements are identified from work orders or equivalent and confirmed with appropriate parties or by site inspection.
	1.2 Occupational health and safety standards, statutory requirements, relevant Australian standards, codes of practice, manufacturers' specifications, environmental requirements and enterprise procedures are identified, applied and monitored throughout the work procedures.
	1.3 Resources required to satisfy the work plan are identified, obtained and inspected for compliance with the job specifications.
	1.4 Relevant plans, drawings and texts are selected and interpreted in accordance with the work plan.
	1.5 Correct size, type and quantity of materials and components are determined, obtained and inspected for compliance with the job specifications.
	1.6 Work is planned in detail including sequencing and prioritising and considerations made, where appropriate, for the maintenance of plant security and capacity in accordance with system/site requirements.
	1.7 Co-ordination requirements, including requests for isolations where appropriate, are resolved with others involved, affected or required by the work.

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ELEMENT	PERFORMANCE CRITERIA	
	1.8	Potential hazards are identified and control measures are implemented.
	1.9	Work area is prepared in accordance with work requirements and site procedures.
	1.10	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of on-the-job training.
2 Verify the fault.	2.1	System function and principles are determined and understood by referring to drawings, flow charts, equipment manuals and expert personnel.
	2.2	Fault indicators, appropriate technical information, diagnostic techniques are used to verify reported symptoms or faults in accordance with the work plan.
	2.3	Symptoms are reproduced and monitored if practical, whilst due regard for personnel safety and plant security is observed in accordance with the work plan.
3 Find the fault.	3.1	Required isolations are confirmed where appropriate in accordance with site requirements.
	3.2	Fault finding is carried out in conjunction with others involved in, or affected by, the work in accordance with enterprise/job requirements.
	3.3	Equipment components, pipes, couplings, gears and support fixings are inspected for obvious faults in accordance with the work plan.
	3.4	All appropriate fault finding/diagnostic techniques are identified, selected and used to determine the fault in accordance with the work plan.
	3.5	Faulty system equipment/components are localised/isolated and the malfunction is confirmed by inspection and testing in accordance with site requirements and work plan.

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ELEMENT	PERFORMANCE CRITERIA	
	3.6	Test and measurement instruments are used in accordance with manufacturers' instructions.
4 Determine cause of fault.	4.1	All appropriate personnel are consulted in order to obtain as many details relating to the faulty equipment as possible.
	4.2	System monitoring equipment, fault indicators and maintenance records reviewed in order to obtain as many details relating to the faulty equipment as possible
	4.3	Valid conclusions about the nature and cause of the fault are reached from analysis of available evidence in accordance with the work plan.
5 Repair or rectify the fault.	5.1	Required isolations are confirmed where appropriate in accordance with site requirements.
	5.2	Appropriate repair procedures are undertaken in conjunction with others involved in, or affected by, the work in accordance with the work plan.
	5.3	Faulty, worn, damaged or unsecured equipment/components are replaced, repaired or secured in accordance with the work plan.
	5.4	Equipment/components are selected and replaced as required in accordance with appropriate specifications and the work plan.
	5.5	All faults are repaired or rectified in accordance with the work plan.
	5.6	Correct operation of the system is confirmed in accordance with site requirements and work plan.
	5.7	Final job inspection is performed and permits are relinquished as required in accordance with the work plan.
6 Complete the work.	6.1	Work is completed and appropriate personnel notified in accordance with site/enterprise requirements.
	6.2	Work area is cleared of waste, cleaned, restored

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ELEMENT	PERFORMANCE CRITERIA	
		and secured in accordance with site/enterprise procedures.
	6.3	Plant, tools and equipment are maintained and stored in accordance with site/enterprise procedures.
	6.4	Work completion details are finalised in accordance with site/enterprise procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the Essential Skills and Knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired diagnosing and repairing faults in wind turbine control systems.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PM435A Faults in Wind Turbine Mechanical Systems

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant Environmental, Occupational Health and Safety legislation and regulations.
- Relevant plant and equipment, and its location.
- Technical drawings and manufacturers manuals.
- Introduction to and typical arrangements of wind farm power production plant.
- Relevant state and territory regulations.
- Relevant Australian standards.
- Equipment and material required to perform the work.
- Isolation procedures.
- Wind farm principles.
- Wind turbine types and characteristics.
- Wind turbine blade pitch systems types and characteristics.
- Wind turbine yaw system types and characteristics.
- Precision measuring equipment.
- Seals and gaskets.
- Bearings.
- Specialised tools and jigs.

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REQUIRED SKILLS AND KNOWLEDGE

- Rigging and lifting equipment.
- Lubrication systems and oil conditioning systems.
- Gearing and power transmission principles.
- Hand and portable power tools.
- Operational requirements of the equipment.
- Fault finding and diagnostic techniques.
- Repair techniques.

T2 Specific skills needed to achieve the Performance Criteria:

- Interpret technical drawings and manufacturers manuals.
- Apply relevant state and territory regulations.
- Apply electronic principles.
- Apply relevant Australian standards.
- Use tools and relevant equipment.
- Use test and measurement instruments.
- Verify and identify faults.
- Use appropriate fault finding and diagnostic techniques.
- Determine the cause of faults.
- Repair faults.
- Identify and select materials for the job.
- Apply electrical fundamentals.
- Carry out work completion details.
- Communicate effectively.
- Apply data analysis techniques and tools.
- Apply engineering and electronic workshop practices.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

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Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all prerequisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also

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comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) of this unit
  - Demonstrate an appropriate level of employability skillsConduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The knowledge and application of relevant sections of Occupational Health and Safety legislation, statutory legislation, enterprise/site safety procedures; enterprise/site emergency procedures.
  - Preparation and planning of work; Verification techniques; Diagnostic and fault finding techniques and procedures associated with electrical work; Repair techniques and procedures; Completion of work procedures
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or

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simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

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RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Inspection should be planned with the appropriate parties to determine access, conditions and work requirements.

A wind turbine mechanical system may include: blade pitch equipment, yaw control equipment, industrial transmissions, generator, mechanical equipment, cooling systems, winches and hydraulic equipment.

Maintenance may include: visual inspections, replacement of mechanical components, checking the tension of bolts, replacing bearings, replacing seals and o-rings, testing of equipment for correct operation and lubrication of equipment.

Tools may include: micrometers, verniers, dial test indicators, slip gauges, hand tools, hydraulic spanners, customised mandrels, digital height gauges, internal micrometers, depth gauges, air grinders, jigs and fixtures, customised spanners, digital thermometers, oxyacetylene gear and appropriate lifting devices.

Work completion details may include: plant and maintenance records, job cards, check sheets, on device labelling updates and reporting and/or documenting equipment defects.

Work site environment may be affected by nearby plant or processes e.g. chemical, heat, dust, noise height, weather and oil.

Isolations can refer to electrical/mechanical or other associated processes.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Maintenance.

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UEPMNT436A Test and Commission Wind Turbine Control Systems

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to conduct testing and commissioning of wind turbine control systems.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit may require an electrical licence to practise in the workplace.

Practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
UEPMNT362A	Maintain Wind Turbine Control Systems
UEENEEG108A	Trouble-shoot and repair faults in low voltage electrical apparatus and circuits
UEENEEE101A	Apply Occupational Health Safety regulations, codes and practices in the workplace
UEENEEE102A	Fabricate, dismantle, assemble of utilities industry components
UEENEEE104A	Solve problems in d.c. circuits
UEENEEE105A	Fix and secure electrotechnology equipment
UEENEEE107A	Use drawings, diagrams, schedules, standards, cords and specifications
UEENEEG006A	Solve problems in single and three phase low voltage machines
UEENEEG033A	Solve problems in single and three phase low voltage electrical apparatus and circuits
UEENEEG063A	Arrange circuits, control and protection for general electrical installations

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Prerequisite Unit(s) **4)**

UEENEEG101A	Solve problems in electromagnetic devices and related circuits
UEENEEG102A	Solve problems in low voltage a.c. circuits
UEENEEG106A	Terminate cables, cords and accessories for low voltage circuits

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Plan and prepare for the work.	1.1	Work requirements are identified from work orders or equivalent and clarified and confirmed with appropriate parties or by site inspection.
	1.2	Occupational Health and Safety standards, statutory requirements, relevant Australian standards, codes of practice, manufacturers' specifications, environmental requirements and enterprise procedures are identified, applied and monitored throughout the work procedure.
	1.3	Resources required to satisfy the work plan are identified, obtained and inspected for compliance with the job specifications.
	1.4	Relevant plans, drawings and texts are selected and interpreted in accordance with the work plan.
	1.5	Correct size, type and quantity of materials and components are determined, obtained and inspected for compliance with the job specifications.
	1.6	Commissioning is planned in detail including sequencing and prioritising and considerations made, where appropriate, for the maintenance of plant security and capacity in accordance with system/site requirements.
	1.7	Coordination requirements, including requests for isolations where appropriate, are resolved with others involved, affected or required by the work.
	1.8	Potential hazards are identified and control measures are implemented.
	1.9	Work area is prepared in accordance with work requirements and site procedures.
	1.10	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training.

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ELEMENT	PERFORMANCE CRITERIA	
2 Test systems equipment.	2.1	Required isolations are confirmed where appropriate in accordance with site requirements.
	2.2	System equipment is visually inspected to ensure absence of any damage, defects and/or signs of deterioration in accordance with the commissioning plan.
	2.3	System equipment is tested in conjunction with other related systems and equipment to ensure correct operation in accordance with the commissioning plan.
	2.4	Wiring systems are checked and tested in conjunction with other related systems and equipment in accordance with the commissioning plan.
3 Test the system.	3.1	Required isolations are confirmed where appropriate in accordance with site requirements.
	3.2	System is visually inspected to ensure absence of any damage, defects and/or signs of deterioration in accordance with the commissioning plan.
	3.3	System is tested using appropriate plans, drawings and texts in accordance with the commissioning plan.
	3.4	System is tested in conjunction with other related systems and equipment in accordance with the commissioning plan.
	3.5	System test results/observations are interpreted and documented to confirm compliance with commissioning plan.
4 Commission the system.	4.1	Required isolations are confirmed where appropriate in accordance with site requirements.
	4.2	System plant and equipment is set up in accordance with operational requirements/manufacturer specifications.
	4.3	System is set up in accordance with operational requirements/manufacturer specifications.

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ELEMENT	PERFORMANCE CRITERIA	
	4.4	System is commissioned using appropriate plans, drawings and texts in accordance with the commissioning plan.
	4.5	System is commissioned in conjunction with other related systems and equipment in accordance with the commissioning plan.
	4.6	Equipment is commissioned with due regard being paid to plant security and capacity in accordance with the commissioning plan.
	4.7	Faulty equipment is repaired or reported in accordance with site/enterprise procedures.
	4.8	Final job inspection is carried out and permits relinquished as required in accordance with the commissioning plan.
5 Complete the work.	5.1	Commissioning is completed and appropriate personnel notified in accordance with site/enterprise requirements.
	5.2	Work area is cleared of waste, cleaned, restored and secured in accordance with site/enterprise procedures.
	5.3	Plant, tools and equipment are maintained and stored in accordance with site/enterprise procedures.
	5.4	Work completion details are finalised in accordance with site/enterprise procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired testing and commissioning wind turbine control systems.

The extent of the Essential Knowledge and Associated Skills required follows:

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REQUIRED SKILLS AND KNOWLEDGE

KS01-PM436A Wind Turbine Control Systems

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant Environmental, Occupational Health and Safety legislation and regulations.
- Relevant plant and equipment, and its location
- Technical drawings and manufacturers manuals.
- Introduction to and typical arrangements of wind farm power production plant.
- Relevant state and territory regulations.
- Relevant Australian standards.
- Equipment and material required to perform the work.
- Isolation procedures.
- Wind farm control systems principles and practices.
- Electronic principles and applications.
- Instrument calibration techniques.
- Wind farm control systems equipment.
- Generator control systems.
- Test and measurement of control system equipment.
- Layout of plant/work site and operation of its equipment.
- Testing and commissioning techniques and procedures.
- Operational requirements of the equipment.
- Electronic equipment types and characteristics.
- Electrical principles.
- Test and measurement instruments.
- Engineering and electronic workshop practices.

T2 Specific skills needed to achieve the Performance Criteria:

- Interpret technical drawings and manufacturers manuals.
- Apply relevant state and territory regulations.
- Apply relevant Australian standards.
- Use tools and relevant equipment.
- Use test and measurement instruments.
- Inspect and test the wiring systems.
- Inspect, test and monitor equipment.
- Commission wind turbine control systems.
- Select materials for the job.
- Apply electrical principles.
- Apply electronic principles.
- Communicate effectively.
- Apply data analysis techniques and tools.
- Apply engineering and electronic workshop practices.

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Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the range statement of the competency standard unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace; however, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be ‘rich’ in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its ‘richness’. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment

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instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all prerequisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skillsConduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Plan and prepare for the work
  - Test wiring systems
  - Test the system

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- Commission the system
- Complete the work Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items

Context of and specific resources for assessment **9.3)**

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and method and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

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Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Inspection should be planned with the appropriate parties to determine access, conditions and work requirements.

Wind farm control systems may include: generator excitation systems, inverter systems, speed control systems, rectifier systems, blade pitch systems, wind direction sensing systems and yaw control systems.

Wind farm control systems communication systems may include: TCP/IP network, ethernet, fibre optic, wireless, fieldbus, hart protocol, profibus, internet and hard wired.

Wind farm control systems may include one or a combination of: electronic systems, distributive control systems, SCADA, electrical systems, pneumatic systems, hydraulic systems, mechanical systems and PLC systems.

Equipment may include: circuit boards, circuit breakers, transformers, rectifiers, inverters, pressure gauges, electric motors, control cabinets, protection equipment, transmitters, switches, temperature sensors, indicators, meters, proximity probes, fire detectors, smoke detectors and vibration detectors, fibre optic cables, Category 5 cables, wireless transmitters and receivers.

Components may include: fuses, circuit breakers, timers, contactors, contacts, coils, relays, resistors, inductors, capacitors, bridge rectifiers, diodes, heat sinks, solenoids, overloads, plug in printed circuit boards, switches, plugs, cables and thermistors.

Fixed wiring tests can refer to: polarity, loop impedance, insulation resistance and continuity tests.

Materials may refer to: insulation tapes, heat shrink, sleeving, spiral binding, cable

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RANGE STATEMENT

ties, solder, lubricants, oil, greases, sealants, lugs, connectors, terminal blocks, cable markers and identification labels.

Tools, equipment and test and measurement instruments may include: multimeter, decade box, d.c., I/V standard, potentiometer, radiation meter, hand-held communicator, frequency counter, frequency generator, CRO, variac, hand tools, power tools lifting equipment and specialised test equipment.

Fault find and diagnostic techniques may include: linear approach, half split rule, sensory detection/insulation/resistance and continuity test.

Fault indicators may include: self test systems, DCS logs, indication lamps, alarms and flag relays.

Work may be performed in service or out of service.

Work completion details may include: plant and maintenance records, job cards, check sheets and on device labelling updates.

Work site environment may be affected by nearby plant or processes, e.g. heat, noise, dust, oil, water height and chemicals.

Isolations can refer to electrical/mechanical or other associated processes.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Maintenance

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UEPMNT440A Diagnose and repair faults in power plant inverter systems

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to diagnose and repair faults in power plant inverter systems, and associated accessories and wiring systems.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit may require an electrical licence to practise in the workplace.

Practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
UEPMNT366A	Maintain power plant inverter systems
UEENEEG108A	Trouble-shoot and repair faults in low voltage electrical apparatus and circuits
UEENEEE101A	Apply Occupational Health Safety regulations, codes and practices in the workplace
UEENEEE102A	Fabricate, dismantle, assemble of utilities industry components
UEENEEE104A	Solve problems in d.c. circuits
UEENEEE105A	Fix and secure electrotechnology equipment
UEENEEE107A	Use drawings, diagrams, schedules, standards, cords and specifications
UEENEEG006A	Solve problems in single and three phase low voltage machines
UEENEEG033A	Solve problems in single and three phase low voltage electrical apparatus and circuits
UEENEEG063A	Arrange circuits, control and protection for general electrical installations

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Prerequisite Unit(s) **4)**

UEENEEG101A	Solve problems in electromagnetic devices and related circuits
UEENEEG102A	Solve problems in low voltage a.c. circuits
UEENEEG106A	Terminate cables, cords and accessories for low voltage circuits

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 4 Writing 4 Numeracy 4

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and prepare for the work	1.1 Work requirements are identified from request/work orders or equivalent and clarified/confirmed with appropriate parties or by site inspection
	1.2 Occupational Health and Safety standards, statutory requirements, relevant Australian standards, codes of practice, manufacturers' specifications, environmental requirements and enterprise procedures are identified, applied and monitored throughout the work procedure
	1.3 Resources required to satisfy the work plan are identified, obtained and inspected for compliance with the job specifications
	1.4 Relevant plans, drawings and texts are selected and interpreted in accordance with the work plan
	1.5 Correct type and quantity of materials/components are determined, obtained and inspected for compliance with the job specifications
	1.6 Work is planned in detail including sequencing and prioritising and considerations made, where appropriate, for the maintenance of plant security and capacity in accordance with system/site requirements
	1.7 Co-ordination requirements, including requests for isolations where appropriate, are resolved with others involved, affected or required by the work
	1.8 Potential hazards are identified and prevention and/or control measures are selected in accordance with the work plan and site procedures
	1.9 Work area is prepared in accordance with work requirements and site procedures
	1.10 Where appropriate, the teams and individuals roles and responsibilities within the team are

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ELEMENT	PERFORMANCE CRITERIA	
		identified and, where required, assist in the provision of the on-the-job training
2 Verify the fault	2.1	Normal performance and function of the equipment is ascertained by consulting appropriate reference sources in accordance with the work plan
	2.2	Fault indicators and appropriate technical information/diagnostic techniques are used to verify reported symptoms/faults in accordance with the work plan
	2.3	Symptoms are reproduced and monitored if possible, whilst due regard for personnel safety and plant security is observed in accordance with the work plan.
3 Find the fault	3.1	Required isolations are confirmed where appropriate in accordance with site requirements
	3.2	Fault finding is carried out in conjunction with others involved in or affected by the work in accordance with enterprise/job requirements
	3.3	Equipment components, wires and terminations are inspected for obvious faults in accordance with the work plan
	3.4	All appropriate fault finding/diagnostic techniques are identified, selected and used to determine the fault in accordance with the work plan
	3.5	All appropriate components are disconnected to enable accurate test measurements of suspected faulty components without the concern of "back-feed" readings in accordance with the work plan
	3.6	Test and measurement instruments are used in accordance with manufacturer’s instructions and job requirements
4 Determine cause of fault	4.1	All appropriate personnel are consulted in order to obtain as many details relating to the faulty system as possible in accordance with the work

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ELEMENT	PERFORMANCE CRITERIA	
		plan
	4.2	Appropriate use is made of any information from fault indicators and maintenance records in accordance with the work plan
	4.3	Valid conclusions about the nature and cause of the fault are reached from analysis of available evidence in accordance with the work plan
5 Repair or rectify the fault	5.1	Required isolations are confirmed where appropriate in accordance with site requirements
	5.2	Appropriate repair procedures are undertaken in conjunction with others involved in or affected by the work in accordance with the work plan
	5.3	Faulty, worn or damaged components are replaced or repaired in accordance with the work plan
	5.4	Parts and components are selected and replaced as required in accordance with appropriate specifications and the work plan
	5.5	System components disconnected for testing are reconnected having been proven free of faults and all terminations are then checked to ensure they are electrically and mechanically sound in accordance with the work plan
	5.6	All faults are repaired or rectified in accordance with the work plan
	5.7	Final job inspection is performed and permits are relinquished as required in accordance with the work plan
6 Complete the work	6.1	Work is completed and appropriate personnel notified in accordance with site/enterprise requirements
	6.2	Work area is cleared of waste, cleaned, restored and secured in accordance with site/enterprise procedures
	6.3	Plant, tools and equipment are maintained and stored in accordance with site/enterprise

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ELEMENT	PERFORMANCE CRITERIA
	procedures
	6.4 Work completion details are finalised in accordance with site/enterprise procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the Essential Skills and Knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired diagnosing and repairing faults in complex refrigeration / air conditioning equipment.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PM440A Faults in power plant inverter systems

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant Environmental, Occupational Health and Safety legislation and regulations
- Relevant plant and equipment, its location and operation
- Technical drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Relevant state and territory regulations
- Relevant Australian standards;
- Equipment and material required to perform the work;
- Isolation procedures;
- Fault finding and diagnostic techniques;
- Repair techniques;
- Environmental legislation;
- Regulatory procedures;
- Electrical principles;
- Test and measurement instruments;
- Engineering and workshop practice;

T2 Specific skills needed to achieve the Performance Criteria:

- Apply Relevant Environmental, Occupational Health and Safety legislation and regulations
- Interpret Technical drawings and manufacturers manuals
- Apply relevant state and territory regulations

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REQUIRED SKILLS AND KNOWLEDGE

- Apply relevant Australian standards;
- Use test and measurement instruments;
- Use fault finding and diagnostic techniques;
- Determine the cause of faults;
- Repair faults;
- Select materials for the job;
- Apply electrical principles;
- Communicate effectively ;
- Apply data analysis techniques and tools.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being

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assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all prerequisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) of this unit
  - Demonstrate an appropriate level of employability skillsConduct work observing the relevant Anti Discrimination legislation, regulations, polices and

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workplace procedures

- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Preparation and planning of work
  - Verification techniques
  - Diagnostic and fault finding techniques and procedures
  - Where appropriate attainment of an appropriate electrical licence, deeming competency associated with electrical work
  - Repair techniques and procedures
  - Completion of work procedures
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

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Method of assessment **9.4)**

This unit shall be assessed by methods given in 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Inspection should be planned with the appropriate parties to determine access, conditions and work requirements.

Equipment may refer to PLC’s, I/O modules, VDU’s, DCS equipment, communication devices, alarms, stabilised power units and uninterrupted power supply units.

Materials may refer to insulation tapes, heat shrink, sleeving, spiral binding, cable ties, solder, sealants, lugs, connectors, terminal blocks, cable markers and identification

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RANGE STATEMENT

labels.

Components may include fuses/circuit breakers, timers, contactors, contacts, coils, relays, resistors, inductors, capacitors, bridge rectifiers, diodes, heat sinks, solenoids, overloads, plug in printed circuit boards, switches, plugs, cable and thermistors.

Test and measurement instruments may include laptop computer, control system interface devices, multimeters, tong testers, insulation resistance/continuity tester, data loggers, overload injection tester, cathode ray oscilloscope, variac, hand held programmer, frequency generator, voltmeters and ammeters.

Fault finding and diagnostic techniques may include linear approach, half split rule, sensory detection and insulation/continuity tests.

Tests and operational checks may include correct air circulation, drainage, vibration, correct temperature, noise, pressure checks and leak detection.

Work may be performed with equipment on line.

Work completion details may include plant and maintenance records, job cards, check sheets and on device labelling updates.

Work site environment may be affected by nearby plant or processes, e.g. heat, noise, dust, oil, water and chemical.

Isolations can refer to electrical/mechanical or other associated processes.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Maintenance.

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UEPMNT441A Test and commission power plant inverter systems

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to conduct testing and commissioning of power plant inverter systems.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit may require an electrical licence to practise in the workplace.

Practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
UEPMNT366A	Maintain power plant inverter systems
UEENEEG108A	Trouble-shoot and repair faults in low voltage electrical apparatus and circuits
UEENEEE101A	Apply Occupational Health Safety regulations, codes and practices in the workplace
UEENEEE102A	Fabricate, dismantle, assemble of utilities industry components
UEENEEE104A	Solve problems in d.c. circuits
UEENEEE105A	Fix and secure electrotechnology equipment
UEENEEE107A	Use drawings, diagrams, schedules, standards, cords and specifications
UEENEEG006A	Solve problems in single and three phase low voltage machines
UEENEEG033A	Solve problems in single and three phase low voltage electrical apparatus and circuits
UEENEEG063A	Arrange circuits, control and protection for general electrical installations

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Prerequisite Unit(s) **4)**

UEENEEG101A	Solve problems in electromagnetic devices and related circuits
UEENEEG102A	Solve problems in low voltage a.c. circuits
UEENEEG106A	Terminate cables, cords and accessories for low voltage circuits

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 4 Writing 4 Numeracy 4

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and prepare for the work	1.1 Work requirements are identified from request/work orders or equivalent and clarified/confirmed with appropriate parties or by site inspection
	1.2 Occupational Health and Safety standards, statutory requirements, relevant Australian standards, codes of practice, manufacturers' specifications, environmental requirements and enterprise procedures are identified, applied and monitored throughout the work procedure
	1.3 Resources required to satisfy the work plan are identified, obtained and inspected for compliance with the job specifications
	1.4 Relevant plans, drawings and texts are selected and interpreted in accordance with the work plan
	1.5 Correct size, type and quantity of materials/components are determined, obtained and inspected for compliance with the job specifications
	1.6 Work is planned in detail including sequencing and prioritising and considerations made, where appropriate, for the maintenance of plant security and capacity in accordance with system/site requirements
	1.7 Co-ordination requirements, including requests for isolations where appropriate, are resolved with others involved, affected or required by the work
	1.8 Potential hazards are identified and prevention and/or control measures are selected in accordance with the work plan and site procedures
	1.9 Work area is prepared in accordance with work requirements and site procedures
	1.10 Where appropriate, the teams and individuals roles and responsibilities within the team are

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ELEMENT	PERFORMANCE CRITERIA	
		identified and, where required, assist in the provision of the on-the-job training
2 Test the equipment	2.1	Required isolations are confirmed where appropriate in accordance with site requirements
	2.2	Equipment is tested using appropriate plans, drawings and texts in accordance with the work plan
	2.3	Equipment is tested in conjunction with other involved in, or affected by, the work in accordance with the work plan
	2.4	Required test conditions are confirmed and the equipment is inspected to ensure absence of any damage, defects and/or signs of deterioration in accordance with the work plan
	2.5	Equipment is tested using appropriate test techniques in accordance with the work plan
	2.6	Equipment test results/observations are interpreted and documented to confirm compliance with job specifications
3 Commission the equipment	3.1	Required isolations are confirmed where appropriate in accordance with site requirements
	3.2	Equipment is commissioned using appropriate plans, drawings and texts in accordance with the work plan
	3.3	Equipment is commissioned in conjunction with others involved in, or affected by, the work in accordance with the work plan
	3.4	Equipment is set up in accordance with operational requirements/manufacturer specifications
	3.5	Testing and monitoring procedures are followed and results monitored, interpreted and documented to ensure equipment operates/functions within specifications
	3.6	Equipment is commissioned with due regard being paid to plant security and capacity in

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ELEMENT	PERFORMANCE CRITERIA	
		accordance with the work plan
	3.7	Final job inspection is carried out and permits relinquished as required in accordance with the work plan
4 Complete the work	4.1	Work is completed and appropriate personnel notified in accordance with site/enterprise requirements
	4.2	Work area is cleared of waste, cleaned, restored and secured in accordance with site/enterprise procedures
	4.3	Plant, tools and equipment are maintained and stored in accordance with site/enterprise procedures
	4.4	Work completion details are finalised in accordance with site/enterprise procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the Essential Skills and Knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired testing and commissioning complex electrical equipment.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PM441A Power plant inverter systems

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant Environmental, Occupational Health and Safety legislation and regulations
- Relevant plant and equipment, its location and operation
- Technical drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Relevant state and territory regulations
- Relevant Australian standards;
- Equipment and material required to perform the work;

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REQUIRED SKILLS AND KNOWLEDGE

- Isolation procedures;
- Testing and commissioning techniques and procedures;
- Operational requirements of the equipment;
- Regulatory procedures;
- Electrical principles;
- Test and measurement instruments;
- Engineering and electronic workshop practice;

T2 Specific skills needed to achieve the Performance Criteria:

- Apply Relevant Environmental, Occupational Health and Safety legislation and regulations
- Interpret Technical drawings and manufacturers manuals
- Apply relevant state and territory regulations
- Apply relevant Australian standards;
- Use tools and relevant equipment;
- Use test and measurement instruments;
- Inspect and test the wiring systems;
- Inspect, test and monitor equipment;
- Commission complex electrical equipment;
- Select materials for the job;
- Apply regulatory procedures;
- Apply electrical principles;
- Communicate effectively ;
- Apply data analysis techniques and tools;
- Apply engineering and electronic workshop practices.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

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Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all prerequisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also

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comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) of this unit
  - Demonstrate an appropriate level of employability skillsConduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Where appropriate attainment of an appropriate electrical licence, deeming competency associated with electrical work
  - Preparation and planning of work
  - Testing techniques
  - Commissioning procedures
  - Completion of work procedures
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

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- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

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Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Inspection should be planned with the appropriate parties to determine access, conditions and work requirements.

System may include a.c. motors, alternators, d.c. motors, generators, inverters, rectifiers, capacitors, low voltage transformers, switchgear, associated control panels, batteries, control/indication and alarm circuits.

Materials may include masonry anchors, bolts, nuts, washers, screws, rivets, saddles, clips, brackets, solvents, adhesives, insulation tapes, heat shrink, sleeving, spiral binding, cable ties, solder, lubricants, oil, greases, sealants, lugs, connectors, terminal blocks, cable markers, identification labels, transformer oil, jointing compound, cable compounds and phase markers.

Components may include fuses/circuit breakers, timers, contactors, contacts, coils, relays, solenoids, overloads, switches, plugs, busbar, cable, fans, thermostats, elements, seals and motor bearings and brush gear.

Monitoring equipment may include stopwatch, indication lamps, tachometer/ rev counter, LED displays, VDUs, thermometers, mimic panels, position indicators, audio indicators and chart recorders.

Work may be performed with equipment on line.

Work completion details may include plant and maintenance records, job cards, check sheets and on device labelling updates.

Work site environment may be affected by nearby plant or processes, e.g. heat, noise, dust, oil, water and chemical. Isolations can refer to electrical/mechanical or other associated processes.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

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Competency Field **11)**

Maintenance.

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UEPMNT442A Maintain wind turbine generator electrical systems

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to undertake the scheduled maintenance of the electrical systems in large scale wind turbine generators (WTGs).

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit may require an electrical licence to practise in the workplace.

Practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must have been completed.

Common Unit Group

Unit Code	Unit Title
UEPMNT371A	Maintain large scale wind turbine generators
UEENEEG006A	Solve problems in single and three phase low voltage machines
UEENEEE101A	Apply Occupational Health and Safety regulations, codes and practices in the workplace
UEENEEE102A	Fabricate, dismantle, assemble of electrotechnology components
UEENEEE104A	Solve problems in d.c circuits
UEENEEE105A	Fix and secure electrotechnology equipment
UEENEEE107A	Use drawings, diagrams, schedules, standards, codes and specifications
UEENEEG101A	Solve problems in electromagnetic devices and related circuits
UEENEEG102A	Solve problems in low voltage a.c. circuit
UEENEEG106A	Terminate cables, cords and accessories for low voltage circuits

Literacy and numeracy **4.2)**

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skills

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

This unit contains Employability Skills.

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and prepare for the work	1.1 Work requirements are identified from request/work orders or equivalent and clarified/confirmed with appropriate parties or by site inspection
	1.2 Occupational Health and Safety standards, statutory requirements, relevant Australian standards, codes of practice, manufacturer

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ELEMENT	PERFORMANCE CRITERIA	
		specifications, environmental requirements and enterprise procedures are identified, applied and monitored throughout the work procedure.
	1.3	Resources required to satisfy the work plan are identified, obtained and inspected for compliance with the job specifications
	1.4	Relevant plans, drawings and texts are selected and interpreted in accordance with the work plan
	1.5	Work is planned in detail including sequencing and prioritising and considerations made, where appropriate, for the maintenance of plant security and capacity in accordance with system/site requirements
	1.6	Coordination requirements, including requests for isolations where appropriate, are resolved with others involved, affected or required by the work
	1.7	Work area is prepared in accordance with work requirements and site procedures
	1.8	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of on-the-job training
2 Conduct maintenance on WTG electrical systems	2.1	If required, equipment is replaced due to faulty operation or maintenance plan requirements in accordance with manufacturer specifications and site procedures
	2.2	Documented service checklists (or similar documentation) are followed
	2.3	Diagnostic testing and data from monitoring systems is used to identify those components requiring maintenance
	2.4	If required equipment is dismantled for maintenance in accordance with manufacturer specifications and site procedures.
	2.5	Techniques are used to enable identification and/or re-assembly in accordance with job

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ELEMENT	PERFORMANCE CRITERIA	
		requirements and site procedures.
	2.6	If required, new components are obtained and inspected for compliance with manufacturer specifications.
	2.7	Equipment is tested, monitored and adjusted as required in accordance with manufacturer specifications and site/enterprise requirements.
3 Complete the work	3.1	Work is completed and appropriate personnel notified in accordance with site/enterprise requirements
	3.2	Work area is cleared of waste, cleaned, restored and secured in accordance with site/enterprise procedures
	3.3	Plant, tools and equipment are maintained and stored in accordance with site/enterprise procedures
	3.4	Work completion details are finalised in accordance with site/enterprise procedures
	3.5	Lessons learnt from the activity or experience are shared with other team members and recorded for future reference.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

KS01-PM442A Maintain wind turbine generator electrical systems

Evidence shall show that knowledge has been acquired of maintaining wind turbine generator electrical systems to the extent indicated by the following aspects:

T1. Slip ring maintenance

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REQUIRED SKILLS AND KNOWLEDGE

- AC slip rings
- DC slip rings

T2. LV DC systems used in WTGs

- Isolation
- DC battery banks
  - Types of rechargeable batteries
  - Battery chargers
  - Safety around standby power supply systems
  - Battery testing
  - Replacement of batteries

T3. Techniques for recognising wiring failure or potential failure

T4. Using multimeters for typical measurements in the WTG

T5. Overview of electrical generation in WTG

- DC/AC and AC/DC conversion technologies
- Power factor correction techniques
- Power factor correction capacitors
  - Recognising signs of imminent failure
  - Capacitor safety
- Resistor box

T6. Power transformer principles

- Oil sampling
- Breathers

T7. Ring mains units (RMUs)

Evidence Guide

EVIDENCE GUIDE

9) The Evidence Guide forms an integral part of this Unit and shall be used in conjunction with all components parts of this unit and performed in accordance with the Assessment Guidelines of this Training Package.

Overview of 9.1)

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Assessment

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the industry-preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accordance with industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Sources of evidence need to be ‘rich’ in nature to minimise error in judgment.

Activities associated with normal everyday work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its ‘richness’. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines, Section 3.1 of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated:

- On at least two (2) occasions, In accordance with the

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"Assessment Guidelines" for the UEP12 Training Package.

Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframe typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and range; and
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and range; and
  - Demonstrate an understanding of the required skills and knowledge as described in this unit to such an extent that the learner's performance outcome is reported in accordance with the preferred approach; namely a percentile graded result, where required by the regulated environment; and
  - Demonstrate an appropriate level of employability skills; and
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, policies and workplace procedures; and

Demonstrated performance across a representative range of contexts from the prescribed items below:

A	All of the following	• Measure electrical output of generator (voltage and current) using remote monitoring equipment • Use a multimeter to measure ELV and LV voltages
B	All of the following	• Measure specific gravity of battery electrolytes • Top-up the electrolyte of wet-cell batteries • Measure battery cell voltages • Measure battery charger and battery bank outputs • Inspect battery cell terminations and remove corrosion • Confirm correct operation of Uninterruptible Power Supplies (UPS)
C	All of the following	• Inspect and record the status of power factor correction capacitors, ELV and LV wiring, resistor box, and circuit

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		breakers/fuses • Inspect slip rings for signs of damage and wear and report using enterprise procedures
D	All of the following	• Perform electrical isolation of AC and DC buses and equipment outputs/inputs
E	All of the following	• Check external condition of power transformer • Check condition of power transformer breather • Sample power transformer oil
F	All of the following	• Deal with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

These should be used in the formal learning/assessment environment.

Note:

Where simulation is considered a suitable strategy for assessment, conditions must be authentic and as far as possible reproduce and replicate the workplace and be consistent with the approved industry simulation policy.

The resources used for assessment should reflect current industry practices in relation to:

Maintain wind turbine generator electrical systems

Method of assessment

9.4)

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This unit shall be assessed by methods given in the Assessment Guidelines, Section 1.3 of this Training Package.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this competency standard unit applies. This requires assessment in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

For optimisation of training and assessment effort, competency development in this unit may be arranged concurrently with units:

UEPMNT444A	Maintain wind turbine generator mechanical systems
UEPMNT443A	Maintain wind turbine generator control systems

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Climbing equipment, including personnel lifts, climb assist, elevators, ladders

Lifting Apparatus includes winches and cranes

Maintenance may include: visual and olfactory inspections, replacement of electrical components, checking the tension of bolts, servicing and split rings, condition monitoring, battery checking, checking terminations

Tools may include spanners, screwdrivers, side cutters, pliers

Cleaning equipment may inlcude: slip ring cleaner, moisture displacement sprays

Test equipment may include multimeters, battery tester

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RANGE STATEMENT

Electrical systems include generator, high voltage wiring, transformer, convertor/inverter

Large Scale Wind Generators (WTGs) include systems having a rating of greater than 10 kW

Work completion details may include plant and maintenance records, job cards, check sheets, on device labelling updates and reporting and/or documenting equipment defects.

Work site environment may be affected by nearby plant or processes and climatic conditions e.g. wind speed, chemical, heat, dust, noise, height and oil.

Location of wind turbine generators may be in urban, suburban, regional or rural locales and environments.

Isolations can refer to electrical/mechanical or other associated processes.

Generic terms used throughout this Vocational Standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms that apply are given in the Glossaries, Section 2.1 of this Training Package.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Maintenance

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UEPMNT443A Maintain wind turbine generator control systems

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to undertake the scheduled maintenance of the control systems in large scale wind turbine generators (WTGs).

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

Pre-Requisites

Prerequisite Unit(s) **4)**

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Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must have been completed.

Common Unit Group

Unit Code	Unit Title
UEPMNT371A	Maintain large scale wind turbine generators
UEENEEE101A	Apply Occupational Health and Safety regulations, codes and practices in the workplace

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

This unit contains Employability Skills.

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

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Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Plan and prepare for the work	1.1	Work requirements are identified from request/work orders or equivalent and clarified/confirmed with appropriate parties or by site inspection
	1.2	Occupational Health and Safety standards, statutory requirements, relevant Australian standards, codes of practice, manufacturer specifications, environmental requirements and enterprise procedures are identified, applied and monitored throughout the work procedure.
	1.3	Resources required to satisfy the work plan are identified, obtained and inspected for compliance with the job specifications
	1.4	Relevant plans, drawings and texts are selected and interpreted in accordance with the work plan
	1.5	Work is planned in detail including sequencing and prioritising and considerations made, where appropriate, for the maintenance of plant security and capacity in accordance with system/site requirements
	1.6	Coordination requirements, including requests for isolations where appropriate, are resolved with others involved, affected or required by the work
	1.7	Work area is prepared in accordance with work requirements and site procedures

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ELEMENT	PERFORMANCE CRITERIA	
	1.8	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of on-the-job training
2 Conduct maintenance on WTG control systems	2.1	If required, equipment is replaced due to faulty operation or maintenance plan requirements in accordance with manufacturer specifications and site procedures
	2.2	Documented service checklists (or similar documentation) are followed
	2.3	Diagnostic testing and data from monitoring systems are used to identify those components requiring maintenance
	2.4	If required equipment is dismantled for maintenance in accordance with manufacturer specifications and site procedures.
	2.5	Techniques are used to enable identification and/or re-assembly in accordance with job requirements and site procedures.
	2.6	If required, new components are obtained and inspected for compliance with manufacturer specifications.
	2.7	Equipment is tested, monitored and adjusted as required in accordance with manufacturer specifications and site/enterprise requirements.
3 Complete the work	3.1	Work is completed and appropriate personnel notified in accordance with site/enterprise requirements
	3.2	Work area is cleared of waste, cleaned, restored and secured in accordance with site/enterprise procedures
	3.3	Plant, tools and equipment are maintained and stored in accordance with site/enterprise procedures
	3.4	Work completion details are finalised in accordance with site/enterprise procedures

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ELEMENT	PERFORMANCE CRITERIA
	3.5 Lessons learnt from the activity or experience are shared with other team members and recorded for future reference.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

KS01-PM443A Maintain wind turbine generator control systems

Evidence shall show that knowledge has been acquired of maintaining wind turbine generator control systems to the extent indicated by the following aspects:

T1. Principles of programmable logic controllers (PLC), digital control systems (DCS) and similar technology

T2. Sensors used in wind turbine generators

- Current transformers and current sensors
- Voltage transformers and voltage sensors
- Temperature sensors
- Proximity sensors
- Vibration sensors
- Resolvers and encoders
- Wind direction and velocity sensors
- Intrusion sensors
- Position sensors
- Pressure sensors

T3. Analog and digital signals

T4. Overview of data communications techniques applicable to the wind generation industry:

- Ethernet TCP/IP
- Optic fibre
- ‘Fast bus’
- Data security techniques and protocols

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REQUIRED SKILLS AND KNOWLEDGE

T5. Principles of software and firmware upgrades

T6. Integration with SCADA, DCS and similar remote operation systems

- Monitoring sensors using SCADA, DCS and similar remote monitoring technology

Evidence Guide

EVIDENCE GUIDE

9) The Evidence Guide forms an integral part of this Unit and shall be used in conjunction with all components parts of this unit and performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the industry-preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accordance with industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Sources of evidence need to be ‘rich’ in nature to minimise error in judgment.

Activities associated with normal everyday work have a bearing on the decision as to how much and how detailed the data gathered

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will contribute to its ‘richness’. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines, Section 3.1 of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated:

- On at least two (2) occasions. In accordance with the "Assessment Guidelines” for the UEP12 Training Package.

Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframe typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and range; and
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and range; and
  - Demonstrate an understanding of the required skills and knowledge as described in this unit to such an extent that the learner's performance outcome is reported in accordance with the preferred approach; namely a percentile graded result, where required by the regulated environment; and
  - Demonstrate an appropriate level of employability skills; and
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, policies and workplace procedures; and

Demonstrated performance across a representative range of

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contexts from the prescribed items below:

A	All of the following	• Perform a firmware upgrade • Perform a software re-load
B	All of the following	• Interpret fault code (and similar) data produced by monitoring systems
C	All of the following	• Connect data communications cables to control systems and equipment
D	All of the following	• Confirm correct output signals from sensors and encoders
E	All of the following	• Deal with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions.

Context of and specific resources for assessment **9.3)**

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

These should be used in the formal learning/assessment environment.

Note:

Where simulation is considered a suitable strategy for assessment, conditions must be authentic and as far as possible reproduce and replicate the workplace and be consistent with the approved industry simulation policy.

The resources used for assessment should reflect current industry practices in relation to:

Maintain wind turbine generator control systems

Method of assessment **9.4)**

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This unit shall be assessed by methods given in the Assessment Guidelines, Section 1.3 of this Training Package.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this competency standard unit applies. This requires assessment in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

For optimisation of training and assessment effort, competency development in this unit may be arranged concurrently with units:

UEPMNT444A	Maintain wind turbine generator mechanical systems
UEPMNT442A	Maintain wind turbine generator electrical systems

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Climbing equipment, including personnel lifts, climb assist, elevators, ladders

Lifting apparatus includes winches and cranes

Hydraulic equipment includes turbine braking equipment.

Maintenance may include: visual inspections, checking the tension of bolts, condition monitoring, testing of equipment for correct operation, software upgrades, testing and calibrating equipment, ELV wiring inspections, cleaning, adjusting software parameters, hardware upgrades.

Tools may include spanners, screwdrivers, side cutters, pliers, high torquing wrench

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RANGE STATEMENT

Diagrams and plans include Electrical schematics, hydraulic schematics, low-voltage schematics

Test equipment may include multimeters, laptop computers, PC tablet, smart phones and other data acquisition tools and equipment, continuity checkers, cable testers

Sensors include temperature, proximity, vibration, resolvers and encoders, wind direction and velocity, intrusion, voltage, current, position sensor, pressure sensors

Cleaning, including the following equipment and gear:

- Oil spills
- Dust
- Salt
- Water

Large Scale Wind Generators (WTGs) include systems having a rating of greater than 10 kW

Work completion details may include plant and maintenance records, job cards, check sheets, on device labelling updates and reporting and/or documenting equipment defects.

Work site environment may be affected by nearby plant or processes and climatic conditions e.g. wind speed, chemical, heat, dust, noise, height and oil, sea spray, spills and vapours of acids and alkali, hydrogen gas.

Location of wind turbine generators may be in urban, suburban, regional or rural locales and environments.

Isolations can refer to electrical/mechanical or other associated processes.

Generic terms used throughout this Vocational Standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms that apply are given in the Glossaries, Section 2.1 of this Training Package.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Maintenance

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UEPMNT444A Maintain wind turbine generator mechanical systems

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to undertake the maintenance of wind turbine generator (WTG) mechanical systems.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must have been completed.

Common Unit Group

Unit Code	Unit Title
UEPMNT371A	Maintain large scale wind turbine generators
UEENEEE101A	Apply Occupational Health and Safety regulations, codes and practices in the workplace

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

This unit contains Employability Skills.

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged

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Employability Skills	**5)** will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Plan and prepare for the work	1.1	Work requirements are identified from request/work orders or equivalent and clarified/confirmed with appropriate parties or by site inspection
	1.2	Occupational Health and Safety standards, statutory requirements, relevant Australian standards, codes of practice, manufacturer specifications, environmental requirements and enterprise procedures are identified, applied and monitored throughout the work procedure.
	1.3	Resources required to satisfy the work plan are identified, obtained and inspected for compliance with the job specifications
	1.4	Relevant plans, drawings and texts are selected and interpreted in accordance with the work plan
	1.5	Work is planned in detail including sequencing and prioritising and considerations made, where appropriate, for the maintenance of plant security and capacity in accordance with system/site requirements
	1.6	Coordination requirements, including requests for isolations where appropriate, are resolved with others involved, affected or required by the work

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ELEMENT	PERFORMANCE CRITERIA	
	1.7	Work area is prepared in accordance with work requirements and site procedures
	1.8	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of on-the-job training
2 Conduct maintenance on WTG mechanical systems	2.1	If required, equipment is replaced due to faulty operation or maintenance plan requirements in accordance with manufacturer specifications and site procedures
	2.2	Follow documented service checklists (or similar documentation)
	2.3	Use diagnostic testing and data from monitoring systems to identify those components requiring maintenance
	2.4	If required equipment is dismantled for maintenance in accordance with manufacturer specifications and site procedures.
	2.5	Techniques are used to enable identification and/or re-assembly in accordance with job requirements and site procedures.
	2.6	If required, new components are obtained and inspected for compliance with manufacturer specifications.
	2.7	Equipment is tested, monitored and adjusted as required in accordance with manufacturer specifications and site/enterprise requirements.
3 Complete the work	3.1	Work is completed and appropriate personnel notified in accordance with site/enterprise requirements
	3.2	Work area is cleared of waste, cleaned, restored and secured in accordance with site/enterprise procedures
	3.3	Plant, tools and equipment are maintained and stored in accordance with site/enterprise procedures

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ELEMENT	PERFORMANCE CRITERIA
	3.4 Work completion details are finalised in accordance with site/enterprise procedures
	3.5 Lessons learnt from the activity or experience are shared with other team members and recorded for future reference.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

KS01-PM44 Maintain wind turbine generator mechanical systems 4A

Evidence shall show that knowledge has been acquired of maintaining wind turbine generator mechanical systems to the extent indicated by the following aspects:

T1. Principles of hydraulics

- Hydraulic safety
- Hydraulic valves
- Hydraulic schematics

T2. Oil sampling techniques

- Sources of oil contamination

T3. Gearbox fundamentals and principles as used in the wind generation industry

- Planetary gears
- Helical gears
- Early signs of gearbox failure
- Cooling systems
- Oil heaters

T4. Endoscopic inspection techniques

T5. Grease and oil

- grades and constituents
- grease distribution systems and techniques

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REQUIRED SKILLS AND KNOWLEDGE

T6. Backlash - cause and effect

T7. Oil pumps, filters and breathers

T8. Bearing fundamentals and types used in the wind generation industry

T9. Oil and hydraulic sensors

T10. Blade calibration techniques

Evidence Guide

EVIDENCE GUIDE

9) The Evidence Guide forms an integral part of this Unit and shall be used in conjunction with all components parts of this unit and performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

9.1)

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the industry-preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accordance with industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Sources of evidence need to be ‘rich’ in nature to minimise error in judgment.

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Activities associated with normal everyday work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines, Section 3.1 of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated:

- On at least two (2) occasions. In accordance with the "Assessment Guidelines" for the UEP12 Training Package.

Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframe typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and range; and
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and range; and
  - Demonstrate an understanding of the required skills and knowledge as described in this unit to such an extent that the learner's performance outcome is reported in accordance with the preferred approach; namely a percentile graded result, where required by the regulated environment; and
  - Demonstrate an appropriate level of employability skills; and
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, policies and workplace procedures; and

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Demonstrated performance across a representative range of contexts from the prescribed items below:

A All of the following	• Change gearbox oil • Sample gearbox oil • Check the operating temperature of WTG gearbox • Change oil filters and breathers
B All of the following	• Confirm the correct operation of mechanical sensors through SCADA (or similar) analysis
C All of the following	• Read a hydraulic schematic and trace out a hydraulic pathway
D All of the following	• Confirm and calibrate the blades • Confirm and calibrate the positioning sensors
E All of the following	• Deal with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

These should be used in the formal learning/assessment environment.

Note:

Where simulation is considered a suitable strategy for assessment, conditions must be authentic and as far as possible reproduce and replicate the workplace and be consistent with the approved industry simulation policy.

The resources used for assessment should reflect current industry practices in relation to:

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Maintain wind turbine generator mechanical systems

Method of assessment

9.4)

This unit shall be assessed by methods given in the Assessment Guidelines, Section 1.3 of this Training Package.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this competency standard unit applies. This requires assessment in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

For optimisation of training and assessment effort, competency development in this unit may be arranged concurrently with units:

UEPMNT443 Maintain wind turbine generator control systems A

UEPMNT442 Maintain wind turbine generator electrical systems A

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Maintenance tasks on wind turbine generators may include:

Climbing equipment, including personnel lifts, climb assist, elevators

Winches and Cranes

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RANGE STATEMENT

Ladders

Hydraulic equipment, gearboxes, yaw and pitch gear, turbine braking equipment.

Maintenance may include: visual inspections, replacement of mechanical components, checking the tension of bolts, replacing bearings, replacing seals and o-rings, condition monitoring, lubrication, testing of equipment for correct operation, and lubrication of equipment.

Oil sampling techniques

Testing includes visual, auditory and olefactory sensing

Checking of sensors through SCADA

Tools may include spanners, screwdrivers, side cutters, pliers, high torquing wrench, grease pump, endoscopic inspection tools

Test equipment may include laser alignment tools, laptop computers, PC tablet, smart phones and other data acquisition tools and equipment.

Consumables may include gearbox oils, hydraulic oil, bearing grease, paint, detergents, Loctite

Cleaning, including the following equipment and gear:

- Grease from bearings
- Oil spills
- Dust
- Water
- Salt

Hydraulic schematic diagrams

Wind turbine generator range is from 50kW and greater

Work completion details may include plant and maintenance records, job cards, check sheets, on device labelling updates and reporting and/or documenting equipment defects.

Work site environment may be affected by nearby plant or processes and climatic conditions e.g. wind speed, chemical, heat, dust, noise, height and oil, acid and alkalie spills and vapours.

Location of wind turbine generators may be in urban, suburban, regional or rural locales and environments.

Isolations can refer to electrical/mechanical or other associated processes.

Generic terms used throughout this Vocational Standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms that apply are given in the Glossaries, Section 2.1 of this Training Package.

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Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Maintenance

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UEPMNT445A Diagnose and repair faults in large scale wind turbine generators

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to diagnose and repair faults in large scale wind turbine generator (WTG) systems.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit may require an electrical licence to practise in the workplace.

Practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must have been completed.

Common Unit Group

Unit Code	Unit Title
UEPMNT371A	Maintain large scale wind turbines generators
UEENEEG108A	Trouble-shoot and repair faults in low voltage electrical apparatus and circuits
UEENEEE101A	Apply Occupational Health Safety regulations, codes and practices in the workplace
UEENEEE102A	Fabricate, dismantle, assemble of utilities industry components
UEENEEE104A	Solve problems in d.c. circuits
UEENEEE105A	Fix and secure electrotechnology equipment
UEENEEE107A	Use drawings, diagrams, schedules, standards, codes and specifications
UEENEEG006A	Solve problems in single and three phase low voltage machines
UEENEEG033A	Solve problems in single and three phase low voltage electrical apparatus and circuits
UEENEEG063A	Arrange circuits, control and protection for general electrical installations

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Prerequisite Unit(s) **4)**

UEENEEG101A	Solve problems in electromagnetic devices and related circuits
UEENEEG102A	Solve problems in low voltage a.c. circuits
UEENEEG106A	Terminate cables, cords and accessories for low voltage circuits

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 4 Writing 4 Numeracy 4

Employability Skills Information

Employability Skills **5)**

This unit contains Employability Skills.

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Gather data	1.1	Data logging information and error codes are accessed
	1.2	Sensory data on fault or problem (auditory, visual, smell, touch) are gathered
	1.3	Relevant hard copy or online documentation are accessed to support fault finding process
	1.4	Built-in fault indicators and error codes are, where appropriate, examined and correctly interpreted
	1.5	Reference to circuit diagrams, specifications, schematics and/or consultation with technical advise are used to determine circuit/system function and characteristics
2 Interpret data to establish hypothesis in regards to fault	2.1	Knowledge of WTG and performance parameters is applied to interpretation of fault data
	2.2	Faults are verified or localised using correct and appropriate techniques, procedures, tools and test equipment.
	2.3	Priorities are set for testing / replacement of specific components, wiring, and connections in the WTG
3 Repair fault	3.1	Risk analysis of the job is undertaken, and communicated among the work team.
	3.2	Safety precautions such as circuit isolations, physical barriers, and other protective devices or systems are used, where appropriate, to ensure safety
	3.3	Tests are conducted to ensure fault has been correctly repaired or isolated
	3.4	Faulty components that have been removed from service are examined, where possible and cause of problem is identified

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ELEMENT	PERFORMANCE CRITERIA	
	3.5	Loose connections or wiring are repaired
	3.6	Parts likely to be cause of fault are removed and replaced with tested and operational parts
	3.7	System is tested to ensure correct operation
	3.8	Fault finding process and work with technical adviser are effectively escalated to repair complex fault if required
4 Record fault	4.1	Faulty components and parts are correctly tagged, identified and stored or shipped as per enterprise requirements
	4.2	Faults are recorded to standard operating procedures.
	4.3	Cause of complex fault and process of repair is discussed with the team and other personnel using an appropriate forum.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

KS01-PM445A Maintain Large Scale Wind Turbine Generators (WTGs)

Evidence shall show that knowledge has been acquired of diagnosing and repairing large scale wind turbine generators (WTGs) to the extent indicated by the following aspects:

T1. Enterprise WTG control rules and procedures

T2. Enterprise requirements of WTG testing and function

- Communication protocols when problem solving
- Reading and interpreting enterprise datalogs
- Escalation procedures

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REQUIRED SKILLS AND KNOWLEDGE

T3. Key WTG function metrics
T4. Data security techniques and protocols
T5. Pitch system components and wiring and software
T6. Yaw system components and wiring
T7. Gearbox design and functional principles
T8. Generator design and functional principles
T9. WTG control systems
T10. WTG breaking and start-up systems
T11. WTG weather monitoring systems
T12. WTG digital and analog sensors
T13. Error codes from data logging systems
T14. Critical event data analysis
T15. Physical characteristics (sound, look etc) of a functioning WTG

Evidence Guide

EVIDENCE GUIDE

9) The Evidence Guide forms an integral part of this Unit and shall be used in conjunction with all components parts of this unit and performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the industry-preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accordance with industry

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and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Sources of evidence need to be 'rich' in nature to minimise error in judgment.

Activities associated with normal everyday work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines, Section 3.1 of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated:

- On at least two (2) occasions. In accordance with the "Assessment Guidelines" for the UEP12 Training Package.

Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframe typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and range; and
  - Apply sustainable energy principles and practices as

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specified in the Performance Criteria and range; and

- Demonstrate an understanding of the required skills and knowledge as described in this unit to such an extent that the learner's performance outcome is reported in accordance with the preferred approach; namely a percentile graded result, where required by the regulated environment; and
- Demonstrate an appropriate level of employability skills; and
- Conduct work observing the relevant Anti Discrimination legislation, regulations, policies and workplace procedures; and

Demonstrated performance across a representative range of contexts from the prescribed items below:

A All of the following	• Replace ELV and LV fuses • Reset circuit breakers

B All of the following	• Test the WTG systems according to enterprise procedures, including
	  • Pitch system
	  • Yaw system
	  • Gearbox
	  • Generator
	  • Control systems
	  • Braking & start-up systems
	  • Weather monitoring systems

C All of the following	• Interpret a data logs to diagnose the root cause of problem • Interpret an equipment error code to determine root cause of a problem
D All of the following	• Replace a faulty sensor
E All of the following	• Deal with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice

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using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

These should be used in the formal learning/assessment environment.

Note:

Where simulation is considered a suitable strategy for assessment, conditions must be authentic and as far as possible reproduce and replicate the workplace and be consistent with the approved industry simulation policy.

The resources used for assessment should reflect current industry practices in relation to:

Diagnose and repair faults in large scale wind turbine generators

Method of assessment

9.4)

This unit shall be assessed by methods given in the Assessment Guidelines, Section 1.3 of this Training Package.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this competency standard unit applies. This requires assessment in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no concurrent assessment recommendations for this unit.

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Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Diagnosing and rectification of faults on wind turbine generators may include:

Climbing equipment, including personnel lifts, climb assist, elevators, ladders

Lifting apparatus including winches and cranes

Hydraulic equipment, including turbine braking equipment.

Diagnosis and repair may include: visual inspections, accessing data logs and fault diagnosis data, replacement of components not requiring the presence of an external crane, replacement of electrical protection equipment, lose wiring, checking the tension of bolts, replacing sensors, replacing seals and o-rings, lubrication, testing of equipment for correct operation, inspection of slip rings and lubrication of equipment.

Tools may include spanners, screwdrivers, side cutters, pliers, high torque wrench, grease pump

Test equipment may include laser alignment tools, multimeters, laptop computers, PC tablet, smart phones and other data acquisition tools and equipment.

Consumables may include gearbox oils, bearing grease, paint, detergents, ‘Loctite’

Large Scale Wind Generators (WTGs) include systems having a rating of greater than 10 kW

Work completion details may include plant and maintenance records, job cards, check sheets, on device labelling updates and reporting and/or documenting equipment defects.

Data may include both real-time and data-logged

Work site environment may be affected by nearby plant or processes and climatic conditions e.g. wind speed, chemical, heat, dust, noise, height and oil.

Location of wind turbine generators may be in urban, suburban, regional or rural locales and environments.

Documentation may be either paper-based or electronic format.

Isolations can refer to electrical/mechanical or other associated processes.

Generic terms used throughout this Vocational Standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms that apply are given in the Glossaries, Section 2.1 of this Training Package.

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Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Maintenance

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UEPMNT446A Coordinate maintenance on a wind farm

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to coordinate the effective and efficient scheduled and unscheduled servicing and maintenance of a wind farm.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit may require an electrical licence to practise in the workplace.

Practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

Pre-Requisites

Prerequisite Unit(s) **4)**

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Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must have been completed.

Common Unit Group

Unit Code	Unit Title
UEPMNT445A	Diagnose and repair faults in large scale wind turbine generators
UEPMNT448B	Diagnose and repair faults in large scale wind turbine generator control systems
UEPMNT449B	Diagnose and repair faults in large scale wind turbine generator mechanical systems
UEPMNT371A	Maintain large scale wind turbines generators
UEENEEG108A	Trouble-shoot and repair faults in low voltage electrical apparatus and circuits
UEENEEE101A	Apply Occupational Health Safety regulations, codes and practices in the workplace
UEENEEE102A	Fabricate, dismantle, assemble of utilities industry components
UEENEEE104A	Solve problems in d.c. circuits
UEENEEE105A	Fix and secure electrotechnology equipment
UEENEEG107A	Use drawings, diagrams, schedules, standards, cords and specifications
UEENEEG006A	Solve problems in single and three

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Prerequisite Unit(s) **4)**

	phase low voltage machines
UEENEEG033A	Solve problems in single and three phase low voltage electrical apparatus and circuits
UEENEEG063A	Arrange circuits, control and protection for general electrical installations
UEENEEG101A	Solve problems in electromagnetic devices and related circuits
UEENEEG102A	Solve problems in low voltage a.c. circuits
UEENEEG106A	Terminate cables, cords and accessories for low voltage circuits
UEPMNT443A	Maintain wind turbine generator control systems
UEENEEE107A	Use drawings, diagrams, schedules, standards, cords and specifications
UEPMNT444A	Maintain wind turbine generator mechanical systems

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 4 Writing 4 Numeracy 4

Employability Skills Information

Employability Skills **5)**

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Employability Skills **5)**

This unit contains Employability Skills.

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan for scheduled maintenance.	1.1 Maintenance schedules provided by other key stakeholders and organisational representatives are accessed, read and interpreted.
	1.2 Local maintenance work schedules are developed.
	1.3 Stock and spare parts required to conduct scheduled maintenance is available.
2 Coordinate scheduled maintenance	2.1 Roles and tasks are allocated to on-site personnel.
	2.2 Maintenance is performed according to the established timeframes.
	2.3 Maintenance is performed within the established financial budget.
	2.4 Maintenance tasks are completed as per the schedule and to the required standards.
	2.5 Employees are developed and provided with

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ELEMENT	PERFORMANCE CRITERIA	
		on-the-job experience through the allocation of tasks that will provide learning opportunities.
	2.6	Risk control measures are identified, prioritised and evaluated against the maintenance schedule.
	2.7	Relevant work permits are secured to coordinate the performance of maintenance according to requirements and/or established procedures.
3 Respond to WTG breakdown	3.1	An action plan is developed as per requirements and established procedures.
	3.2	Key stakeholders, customers and other appropriate personnel and organisations are advised of the outage.
	3.3	Out-of-hours breakdown roster is current and applied.
	3.4	Initial analysis of breakdown to determine likely remediation actions is undertaken.
	3.5	Resources to find cause of fault or breakdown are allocated.
	3.6	Enterprise escalation procedures are applied.
	3.7	The most appropriate remediation choice for defective components and plant is selected.
	3.8	Technical advice is given regarding potential hazards, safety risks and control measures so that monitoring and preventative action can be undertaken and/or appropriate authorities consulted, where necessary, in accordance with requirements and established procedures.
	3.9	Solutions to non-routine problems are identified and actioned, using acquired essential knowledge and associated skills, according to requirements.
4 Produce production and maintenance reports	4.1	WTG records for the purpose of producing maintenance reports are accessed.
	4.2	Reports are produced as per enterprise standards using applicable software and formats.

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ELEMENT	PERFORMANCE CRITERIA	
	4.3	Reports are distributed to applicable stakeholders, customers and other appropriate personnel.
5 Make recommendations for dealing with WTG breakdowns	5.1	Lessons learnt from outages are documented.
	5.2	Discussions are held with team members to facilitate learning and communication regarding managing and dealing with similar WTG breakdowns.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

KS01-PM44 Coordinate maintenance on a wind farm
6A

Evidence shall show that knowledge has been acquired of coordinating wind farm maintenance to the extent indicated by the following aspects:

T1. Report writing skills

- Enterprise standards and styles

T2. Enterprise escalation procedures

T3. Local applicable licensing rules and regulations

- Live work restrictions
- Working at heights restrictions
- Single person working
- Industrial agreements
- Fatigue management rules

T4. Team leadership skills fundamentals

- Communication in a team environment

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REQUIRED SKILLS AND KNOWLEDGE

- Developing personnel through task allocation
- Organising work schedules

T5. Equipment spares and consumables

- Local enterprise procedures for inventory management

Evidence Guide

EVIDENCE GUIDE

9) The Evidence Guide forms an integral part of this Unit and shall be used in conjunction with all components parts of this unit and performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the industry-preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accordance with industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Sources of evidence need to be ‘rich’ in nature to minimise error in judgment.

Activities associated with normal everyday work have a bearing on the decision as to how much and how detailed the data gathered

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will contribute to its ‘richness’. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines, Section 3.1 of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated:

- On at least two (2) occasions. In accordance with the "Assessment Guidelines” for the UEP12 Training Package.

Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and range; and
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and range; and
  - Demonstrate an understanding of the required skills and knowledge as described in this unit to such an extent that the learner's performance outcome is reported in accordance with the preferred approach; namely a percentile graded result, where required by the regulated environment; and
  - Demonstrate an appropriate level of employability skills; and
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, policies and workplace procedures; and

Demonstrated performance across a representative range of

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contexts from the prescribed items below:

A All of the following	• Develop a local scheduled maintenance plan.
B All of the following	• Coordinate a scheduled maintenance program. • Develop a risk control register for a scheduled maintenance program. • Provide direction to on-site personnel, contractors, enterprise staff external to site, and any other persons involved in the maintenance activity.
C All of the following	• Produce a maintenance report based upon the enterprise's requirements and standards.
D All of the following	• Deal with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

These should be used in the formal learning/assessment environment.

Note:

Where simulation is considered a suitable strategy for assessment, conditions must be authentic and as far as possible reproduce and replicate the workplace and be consistent with the approved industry simulation policy.

The resources used for assessment should reflect current industry practices in relation to:

Coordinate maintenance on a wind farm

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Method of assessment **9.4)**

This unit shall be assessed by methods given in the Assessment Guidelines, Section 1.3 of this Training Package.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this competency standard unit applies. This requires assessment in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

There are no concurrent assessment recommendations for this unit.

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Coordination of maintenance tasks on wind turbine generators may include:

Maintenance can be either scheduled or unscheduled

Documentation and reports can be either paper-based, soft-copy or in other electronic formats

Maintenance personnel includes on-site staff, enterprise staff located off-site, manufacturers' representatives, and other technical experts

Local applicable licensing rules and regulations can include:

- Live work restrictions
- Working at heights restrictions
- Single person working
- Industrial agreements

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RANGE STATEMENT

- Fatigue management rules

Scheduled and unscheduled maintenance may include (and is not limited to): visual inspections, accessing data logs and fault diagnosis data, replacement of components and plant including generators, replacement of electrical protection equipment, checking for lose wiring, checking the tension of bolts, replacing sensors, replacing seals and o-rings, lubrication, testing of equipment for correct operation, inspection of slip rings and lubrication of equipment.

Wind turbine range is from 10kW and greater

Work site environment may be affected by nearby plant or processes and climatic conditions e.g. wind speed, chemical, heat, dust, noise, height and oil.

Location of wind turbine generators may be in urban, suburban, regional or rural locales and environments.

Generic terms used throughout this Vocational Standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms that apply are given in the Glossaries, Section 2.1 of this Training Package.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Maintenance

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UEPMNT447A Diagnose and repair faults in wind turbine generator electrical systems

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to diagnose and repair faults in large scale wind turbine generator (WTG) electrical systems.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

During Training: Competency development activities are subject to regulations directly related to licencing, occupational health and safety and where applicable contracts of training such as apprenticeships.

In the workplace: The application of the skills and knowledge described in this unit require a license to practice in the workplace where work is carried out on electrical equipment or installations which are designed to operate at voltages greater than 50 V a.c. or 120 V d.c.

Other conditions may apply under State and Territory legislative and regulatory requirements.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must have been completed.

Common Unit Group

Unit Code	Unit Title
UEPMNT371A	Maintain large scale wind turbine generators
UEPMNT442A	Maintain wind turbine generator electrical systems
UEPMNT445A	Diagnose and repair faults in large scale wind turbine generators
UEENEEE101A	Apply Occupational Health and Safety regulations, codes and practices in the workplace
UEENEEE102A	Fabricate, dismantle, assemble of electrotechnology components
UEENEEE104A	Solve problems in d.c circuits
UEENEEE105A	Fix and secure electrotechnology equipment
UEENEEE107A	Use drawings, diagrams, schedules, standards, codes and specifications
UEENEEG006A	Solve problems in single and three phase low voltage machines
UEENEEG033A	Solve problems in single and three phase low voltage electrical apparatus and circuits

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Prerequisite Unit(s) **4)**

UEENEEG063A	Arrange circuits, control and protection for general electrical installations
UEENEEG101A	Solve problems in electromagnetic devices and related circuits
UEENEEG102A	Solve problems in low voltage a.c. circuits
UEENEEG106A	Terminate cables, cords and accessories for low voltage circuits
UEENEEG108A	Trouble-shoot and repair faults in low voltage electrical apparatus and circuits

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 4 Writing 4 Numeracy 4

Employability Skills Information

Employability Skills **5)**

This unit contains Employability Skills.

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

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Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Gather data	1.1	Data logging information and error codes are accessed
	1.2	Sensory data on fault or problem (auditory, visual, smell, touch), is gathered
	1.3	Relevant hard copy or online documentation is accessed to support fault finding process
	1.4	Built-in fault indicators and error codes are, where appropriate, examined and correctly interpreted
	1.5	Reference to circuit diagrams, specifications, schematics and/or consultation with technical adviser is used are used to determine circuit/system function and characteristics
2 Interpret data to establish hypothesis in regards to WTG electrical system fault	2.1	Knowledge of WTG electrical systems and performance parameters is applied to interpretation of fault data
	2.2	Faults are verified or localised using correct and appropriate techniques, procedures, tools and test equipment.
	2.3	Priorities are set for testing / replacement of specific components, wiring, and connections in the WTG
3 Repair WTG electrical system fault	3.1	Risk analysis of the job is undertaken and communicated among the work team.
	3.2	Safety precautions such as circuit isolations, physical barriers, and other protective devices or

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ELEMENT	PERFORMANCE CRITERIA	
		systems are, where appropriate, used to ensure safety
	3.3	Tests are conducted to ensure fault has been correctly repaired or isolated
	3.4	Faulty components that have been removed from service are examined and where possible the cause of problem is identified
	3.5	Loose connections or wiring are repaired
	3.6	Parts likely to be cause of fault are removed and replaced with tested and operational parts
	3.7	System is tested to ensure correct operation
	3.8	Fault finding processes and work to repair complex fault(s) are, if required, effectively escalated with technical adviser.
4 Record WTG electrical system fault	4.1	Faulty components and parts are correctly tagged, identified and stored or shipped as per enterprise requirements
	4.2	Faults are recorded to standard operating procedures.
	4.3	Cause of complex fault and process of repair is discussed with the team and other personnel using an appropriate forum.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

KS01-PM44 Diagnose and repair faults in wind turbine generator electrical systems 7A

Evidence shall show that knowledge has been acquired of diagnosing and repairing

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REQUIRED SKILLS AND KNOWLEDGE

wind turbine generator electrical systems to the extent indicated by the following aspects:

T1. Slip ring

- installation/replacement
- repair

T2. Isolation diode

- fault diagnosis
- replacement

T3. Diagnose and repair uninterruptible power supply (UPS) systems

T4. Diagnose and repair DC back-up supply systems

- Battery banks

T5. Techniques for replacing damaged wiring (where permitted)

T6. Reset principles for protection devices

T7. Live trouble-shooting

T8. Diagnose and repair power factor correction equipment

- Capacitors
- ‘Flexi-slip’ system
- Solid-state phase feedback conversion systems
- Resistors

T9. Wave pattern analysis

T10. Current measurements

T11. Interfacing to the power grid

- Grid failure response
- Principles of grid synchronisation

T12. Safety chain

- Troubleshooting
- Isolating issues

T13. Terminating lugs and connectors specific to the industry

T14. In-rush protection circuitry, function and repair

- Crowbar protection circuitry

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Evidence Guide

EVIDENCE GUIDE

9) The Evidence Guide forms an integral part of this Unit and shall be used in conjunction with all components parts of this unit and performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the industry-preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accordance with industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Sources of evidence need to be ‘rich’ in nature to minimise error in judgment.

Activities associated with normal everyday work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its ‘richness’. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines, Section 3.1 of this Training Package.

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Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated:

- On at least two (2) occasions, In accordance with the "Assessment Guidelines" for the UEP12 Training Package.

Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframe typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and range; and
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and range; and
  - Demonstrate an understanding of the required skills and knowledge as described in this unit to such an extent that the learner's performance outcome is reported in accordance with the preferred approach; namely a percentile graded result, where required by the regulated environment; and
  - Demonstrate an appropriate level of employability skills; and
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, policies and workplace procedures; and

Demonstrated performance across a representative range of contexts from the prescribed items below:

A	All of the following	• Replace a battery cell in a DC battery bank • Repair an uninterruptible power supply (UPS) by replacing user-serviceable component/s
B	All of the following	• Diagnose and replace an isolation diode • Repair a faulty 'crowbar' protection circuit

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		• Replace a defective power factor correction capacitor
C	All of the following	• Replace a defective LV circuit breaker • Perform a ‘cold’ start up sequence on the WTG
D	All of the following	• Measure output current using current tongs • Measure HV, LV and ELV voltages through use of the appropriate test measurement tool • Perform wave analysis using an appropriate text measurement tool
E	All of the following	• Confirm correct operation of grid isolation circuitry
F	All of the following	• Repair damaged or faulty slip rings • Replace slip rings
G	All of the following	• Replace a power transformer desiccant breather
H	All of the following	• Deal with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

These should be used in the formal learning/assessment environment.

Note:

Where simulation is considered a suitable strategy for assessment, conditions must be authentic and as far as possible reproduce and replicate the workplace and be consistent with the approved industry simulation policy.

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The resources used for assessment should reflect current industry practices in relation to:

Diagnose and repair faults in wind turbine generator electrical systems

Method of assessment

9.4)

This unit shall be assessed by methods given in the Assessment Guidelines, Section 1.3 of this Training Package.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this competency standard unit applies. This requires assessment in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

For optimisation of training and assessment effort, competency development in this unit may be arranged concurrently with units:

UEPMNT448A	Diagnose and repair faults in wind turbine generator control systems
UEPMNT449A	Diagnose and repair mechanical systems faults in wind turbine generators

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

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RANGE STATEMENT

Climbing equipment, including personnel lifts, climb assist, elevators, kadders

Lifting apparatus includes winches and cranes

Diagnose and rectification of faults in wind turbine generator electrical systems may include:

Power transformers and ring mains units (RMU)s as used for WTGs

Hydraulic equipment, including turbine braking equipment.

Diagnosis and repair may include: visual inspections, replacement of electrical components, replacement of electrical protection equipment, isolation diodes, uninterruptible power supplies (UPS, safety chain, DC systems, power factor correction equipment, lose wiring, checking the tension of bolts, replacing sensors, replacing slip rings, testing of equipment for correct operation

Tools may include spanners, screwdrivers, side cutters, pliers, wire strippers, RCD protection devices

Consumables include electrical tape, lugs and connectors

Test equipment may include multimeters, current tongs, micro-ohm meters, laptop computers, PC tablet, smart phones and other data acquisition tools and equipment.

Large Scale Wind Generators (WTGs) include systems having a rating of greater than 10 kW

Work completion details may include plant and maintenance records, job cards, check sheets, on device labelling updates and reporting and/or documenting equipment defects.

Work site environment may be affected by nearby plant or processes and climatic conditions e.g. wind speed, chemical, heat, dust, noise, height and oil.

Location of wind turbine generators may be in urban, suburban, regional or rural locales and environments.

Documentation may be either paper-based or electronic format.

Isolations can refer to electrical/mechanical or other associated processes.

Generic terms used throughout this Vocational Standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms that apply are given in the Glossaries, Section 2.1 of this Training Package.

Unit Sector(s)

Not applicable.

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Competency Field

Competency Field **11)**

Maintenance

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UEPMNT448A Diagnose and repair faults in wind turbine generator control systems

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to diagnose and repair faults in large scale wind turbine generator (WTG) control systems.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit may require an electrical licence to practise in the workplace.

Practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must have been completed plus all the competencies in one (1) of the identified Pathway Unit Group(s):

Common Unit Group

Unit Code	Unit Title
UEPMNT371A	Maintain large scale wind turbine generators
UEPMNT443A	Maintain wind turbine generator control systems
UEPMNT445A	Diagnose and repair faults in large scale wind turbine generators
UEENEEG108A	Trouble-shoot and repair faults in low voltage electrical apparatus and circuits
UEENEEE101A	Apply Occupational Health Safety regulations, codes and practices in the workplace
UEENEEE102A	Fabricate, dismantle, assemble of utilities industry components
UEENEEE104A	Solve problems in d.c. circuits
UEENEEE105A	Fix and secure electrotechnology equipment
UEENEEE107A	Use drawings, diagrams, schedules, standards, codes and specifications
UEENEEG006A	Solve problems in single and three phase low voltage machines
UEENEEG033A	Solve problems in single and three

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Prerequisite Unit(s) **4)**

	phase low voltage electrical apparatus and circuits
UEENEEG063A	Arrange circuits, control and protection for general electrical installations
UEENEEG101A	Solve problems in electromagnetic devices and related circuits
UEENEEG102A	Solve problems in low voltage a.c. circuits
UEENEEG106A	Terminate cables, cords and accessories for low voltage circuits

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 4 Writing 4 Numeracy 4

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the Performance Criteria describe the required performance

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essential outcomes of a competency standard unit	needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Gather data	1.1 Data logging information and error codes are accessed
	1.2 Sensory data on fault or problem (auditory, visual, smell, touch) is gathered
	1.3 Relevant hard copy or online documentation is accessed to support fault finding process
	1.4 Built-in fault indicators and error codes are, where appropriate, examined and correctly interpreted
	1.5 Reference to circuit diagrams, specifications, schematics and/or consultation with technical adviser is used to determine circuit/system function and characteristics
2 Interpret data to establish hypothesis in regards to WTG control system fault	2.1 Knowledge of WTG control systems and performance parameters is applied to interpretation of fault data
	2.2 Faults are verified or localised using correct and appropriate techniques, procedures, tools and test equipment.
	2.3 Priorities are set for testing / replacement of specific components, wiring, and connections in the WTG
3 Repair WTG control system fault	3.1 Risk analysis of the job is undertaken, and communicated among the work team.
	3.2 Safety precautions such as circuit isolations, physical barriers, and other protective devices or systems are used, where appropriate, to ensure safety

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ELEMENT	PERFORMANCE CRITERIA	
	3.3	Tests are conducted to ensure fault has been correctly repaired or isolated
	3.4	Faulty components that have been removed from service, where possible, are examined and cause of problem is identified
	3.5	Loose connections or wiring are repaired
	3.6	Parts likely to be cause of fault are removed and replaced with tested and operational parts
	3.7	Systems are tested to ensure correct operation
	3.8	Fault finding processes are effectively escalated and, if required, work with technical adviser is undertaken to repair complex fault
4 Record WTG control system fault	4.1	Faulty components and parts are correctly tagged, identified and stored or shipped as per enterprise requirements
	4.2	Faults are recorded to standard operating procedures.
	4.3	Cause of complex fault and process of repair is discussed with the team and other personnel using an appropriate forum.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the Essential Skills and Knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired diagnosing and repairing faults in wind turbine generator control systems.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-MNT448A Diagnose and repair faults in wind turbine generator control systems

Evidence shall show that knowledge has been acquired of diagnosing and repairing wind turbine generator control systems to the extent indicated by the following aspects:

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REQUIRED SKILLS AND KNOWLEDGE

-
- T1. Programmable logic controllers (PLCs), digital control systems (DCS) and similar technology
  - Firmware and software upgrades
  - Reading data
  - Addressing controllers
  - Binary and hexadecimal numerical conversion
  - Parameter entry
  - Interfacing to other computers and peripheral devices
- T2. Reading fault codes and indicators directly from WTG control equipment
- T3. Software reloading techniques
- T4. Data communications analysis units
- T5. Sensor data analysis

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

9.1)

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or in a realistically simulated work environment. It is recognised that, in some circumstances,

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assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated:

- On at least two (2) occasions, In accordance with the "Assessment Guidelines" for the UEP12 Training Package.

Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframe typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and range; and
  - Apply sustainable energy principles and practices as

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specified in the Performance Criteria and range; and

- Demonstrate an understanding of the required skills and knowledge as described in this unit to such an extent that the learner's performance outcome is reported in accordance with the preferred approach; namely a percentile graded result, where required by the regulated environment; and
- Demonstrate an appropriate level of employability skills; and
- Conduct work observing the relevant Anti Discrimination legislation, regulations, policies and workplace procedures; and

Demonstrated performance across a representative range of contexts from the prescribed items below:

A	Perform a firmware upgrade Perform a software re-load
B	Interpret fault code (and similar) data produced by monitoring systems
C	Connect data communications cables to control systems and equipment Interrogate control systems using 3rd party software systems
D	Confirm correct output signals from sensors and encoders
E	Deal with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this

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unit.

These should be used in the formal learning/assessment environment.

Note:

Where simulation is considered a suitable strategy for assessment, conditions must be authentic and as far as possible reproduce and replicate the workplace and be consistent with the approved industry simulation policy.

The resources used for assessment should reflect current industry practices in relation to:

- Diagnose and repair faults in wind turbine generator control systems

Method of assessment **9.4)**

This unit shall be assessed by methods given in 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Unit Code	Unit Title
UEPMNT449A	Diagnose and repair mechanical systems faults in wind turbine generators
UEPMNT4	Diagnose and repair faults in wind turbine generator

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47A electrical systems

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Climbing equipment, including personnel lifts, climb assist, elevators, ladders

Lifting Apparatus includes winches and cranes

Hydraulic equipment including turbine braking equipment.

Diagnosis and repair may include: visual inspections, replacement, lose wiring, checking the tension of bolts, replacing sensors, testing of equipment for correct operation, software and firmware upgrades and reinstallation.

Tools may include spanners, screwdrivers, side cutters, pliers

Test equipment may include laser, multimeters, laptop computers, PC tablet, smart phones and other data acquisition tools and equipment.

Large Scale Wind Generators (WTGs) include systems having a rating of greater than 10 kW

Work completion details may include plant and maintenance records, job cards, check sheets, on device labelling updates and reporting and/or documenting equipment defects.

Work site environment may be affected by nearby plant or processes and climatic conditions e.g. wind speed, chemical, heat, dust, noise, height and oil.

Location of wind turbine generators may be in urban, suburban, regional or rural locales and environments.

Documentation may be either paper-based or electronic format.

Isolations can refer to electrical/mechanical or other associated processes.

Generic terms used throughout this Vocational Standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms that apply are given in the Glossaries, Section 2.1 of this Training Package.

Unit Sector(s)

Not applicable.

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Competency Field

Competency Field **11)**

Maintenance.

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UEPMNT449A Diagnose and repair mechanical systems faults in wind turbine generators

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to diagnose and repair mechanical systems faults in large scale wind turbine generator (WTG).

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice 3)

The skills and knowledge described in this unit may require an electrical licence to practise in the workplace.

Practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must have been completed.

Common Unit Group

Unit Code	Unit Title
UEPMNT371A	Maintain large scale wind turbines generators
UEPMNT444A	Maintain wind turbine generator mechanical systems
UEPMNT445A	Diagnose and repair faults in large scale wind turbine generators
UEENEEG108A	Trouble-shoot and repair faults in low voltage electrical apparatus and circuits
UEENEEE101A	Apply Occupational Health Safety regulations, codes and practices in the workplace
UEENEEE102A	Fabricate, dismantle, assemble of utilities industry components
UEENEEE104A	Solve problems in d.c. circuits
UEENEEE105A	Fix and secure electrotechnology equipment
UEENEEE107A	Use drawings, diagrams, schedules, standards, codes and specifications
UEENEEG006A	Solve problems in single and three phase low voltage machines
UEENEEG033A	Solve problems in single and three phase low voltage electrical

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Prerequisite Unit(s) **4)**

	apparatus and circuits
UEENEEG063A	Arrange circuits, control and protection for general electrical installations
UEENEEG101A	Solve problems in electromagnetic devices and related circuits
UEENEEG102A	Solve problems in low voltage a.c. circuits
UEENEEG106A	Terminate cables, cords and accessories for low voltage circuits

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 4 Writing 4 Numeracy 4

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the Performance Criteria describe the required performance

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essential outcomes of a competency standard unit	needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT		PERFORMANCE CRITERIA	
1	Gather data	1.1	Data logging information and error codes are accessed
		1.2	Sensory data on fault or problem are gathered (auditory, visual, smell, touch)
		1.3	Relevant hard copy or online documentation to support fault finding process are accessed
		1.4	Built-in fault indicators and error codes, where appropriate, are examined and correctly interpreted
		1.5	Circuit/system function and characteristics are determined by reference to circuit diagrams, specifications, schematics and/or consultation with technical adviser.
2	Interpret data to establish hypothesis in regards to WTG mechanical system fault	2.1	Knowledge of WTG mechanical systems and performance parameters is applied to interpretation of fault data
		2.2	Faults are verified or localised using correct and appropriate techniques, procedures, tools and test equipment.
		2.3	Priorities are set for testing / replacement of specific components, wiring, and connections in the WTG
3	Repair WTG mechanical system fault	3.1	Risk analysis of the job is undertaken, and communicated among the work team.
		3.2	Safety precautions such as circuit isolations, physical barriers, and other protective devices or systems are used, where appropriate,to ensure safety

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ELEMENT		PERFORMANCE CRITERIA	
		3.3	Tests are conducted to ensure fault has been correctly repaired or isolated
		3.4	Faulty components that have been removed from service are, where possible, examined and cause of problem is identified
		3.5	Loose connections or wiring are repaired
		3.6	Parts likely to be cause of fault are removed and replaced with tested and operational parts
		3.7	Systems are tested to ensure correct operation
		3.8	Fault finding processes and work to repair complex fault(s) are, if required, effectively escalated with technical adviser.
4	Record WTG mechanical system fault	4.1	Faulty components and parts are correctly tagged, identified and stored or shipped as per enterprise requirements
		4.2	Faults are recorded to standard operating procedures.
		4.3	Cause of complex fault and process of repair is discussed with the team and other personnel using an appropriate forum.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the Essential Skills and Knowledge and their level, required for this unit.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

KS01-PM4349A Diagnose and repair mechanical systems faults in wind turbine generators

Evidence shall show that knowledge has been acquired of diagnosing and repairing wind turbine generator mechanical systems to the extent indicated by the following aspects:

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REQUIRED SKILLS AND KNOWLEDGE

- T1. Diagnose and repair pitch drive
  - • Hydraulic systems
  - • Mechanical systems
- T2. Diagnose and repair yaw drive
- T3. Diagnose and repair WTG gearbox
- T4. Non-pitch turbine braking systems
- T5. Diagnose and repair hydraulic pumps
- T6. Field-based oil testing techniques

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

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The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated:

- On at least two (2) occasions, In accordance with the "Assessment Guidelines" for the UEP12 Training Package.

Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframe typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and range; and
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and range; and
  - Demonstrate an understanding of the required skills and knowledge as described in this unit to such an extent that the learner's performance outcome is reported in accordance with the preferred approach; namely a percentile graded result, where required by the regulated environment; and
  - Demonstrate an appropriate level of employability skills;

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and

- Conduct work observing the relevant Anti Discrimination legislation, regulations, policies and workplace procedures; and

Demonstrated performance across a representative range of contexts from the prescribed items below:

A	All of the following: Inspect a gearbox using an endoscope Replace a worn gear in the gearbox Replace a gearbox bearing Perform in-field oil testing
B	All of the following: Diagnose and repair a faulty pitch drive Diagnose and repair a faulty yaw drive
C	All of the following: Diagnose and repair non-pitch turbine braking systems
D	All of the following: Deal with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions.

Context of and specific resources for assessment

9.3)

d be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

These should be used in the formal learning/assessment environment.

Note:

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Where simulation is considered a suitable strategy for assessment, conditions must be authentic and as far as possible reproduce and replicate the workplace and be consistent with the approved industry simulation policy.

The resources used for assessment should reflect current industry practices in relation to:

- Diagnose and repair mechanical systems faults in wind turbine generators

Method of assessment **9.4)**

This unit shall be assessed by methods given in 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

For optimisation of training and assessment effort, competency development in this unit may be arranged concurrently with units:

Unit Code	Unit Title
UEPMNT448A	Diagnose and repair faults in wind turbine generator control systems
UEPMNT447A	Diagnose and repair faults in wind turbine generator electrical systems

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Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Climbing equipment includes personnel lifts, climb assist, elevators, ladders

Lifting apparatus includes winches and cranes

Equipment includes: pitch drives, yaw drive, gearbox, non-pitch turbine braking systems

Repairs may include complete change out of gearbox, pitch drives, yaw drives

Gearbox diagnosis and repair may include: micro-pitting, grinding temper, pressure marking, contaminated oil, rust, contamination by foreign bodies, oil leaks, choked breathers, loose mountings, excessive vibration, oil temperature out-of-limits, shaft replacement

Tools may include spanners, screwdrivers, side cutters, pliers, high torque wrench, grease pump, endoscope, callipers, micrometers, wire gauges, feeler gauges

Test equipment may include laser alignment tools, multimeters, laptop computers, PC tablet, smart phones and other data acquisition tools and equipment.

Consumables may include gearbox oils, bearing grease, paint, detergents, ‘Loctite’

Large Scale Wind Generators (WTGs) include systems having a rating of greater than 10 kW

Work completion details may include plant and maintenance records, job cards, check sheets, on device labelling updates and reporting and/or documenting equipment defects.

Work site environment may be affected by nearby plant or processes and climatic conditions e.g. wind speed, chemical, heat, dust, noise, height and oil.

Location of wind turbine generators may be in urban, suburban, regional or rural locales and environments.

Documentation may be either paper-based or electronic format.

Isolations can refer to electrical/mechanical or other associated processes.

Generic terms used throughout this Vocational Standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms that apply are given in the Glossaries, Section 2.1 of this Training Package.

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Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Maintenance.

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UEPMNT450A Test and commission wind turbine generators

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to conduct testing and commissioning of a wind turbine generator (WTG).

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit may require an electrical licence to practise in the workplace.

Practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

Pre-Requisites

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Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must have been completed plus all the competencies in one (1) of the identified Pathway Unit Group(s):

Common Unit Group

Unit Code	Unit Title
UEPMNT371A	Maintain large scale wind turbine generators
UEPMNT444A	Maintain wind turbine generator mechanical systems
UEPMNT443A	Maintain wind turbine generator control systems
UEPMNT448A	Diagnose and repair faults in wind turbine generator control systems
UEPMNT449A	Diagnose and repair mechanical systems faults in wind turbine generators
UEPMNT445A	Diagnose and repair faults in large scale wind turbine generators
UEENEEG108A	Trouble-shoot and repair faults in low voltage electrical apparatus and circuits
UEENEEE101A	Apply Occupational Health Safety regulations, codes and practices in the workplace
UEENEEE102A	Fabricate, dismantle, assemble of utilities industry components
UEENEEE104A	Solve problems in d.c. circuits
UEENEEE105A	Fix and secure electrotechnology

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	equipment
UEENEEE107A	Use drawings, diagrams, schedules, standards, codes and specifications
UEENEEG006A	Solve problems in single and three phase low voltage machines
UEENEEG033A	Solve problems in single and three phase low voltage electrical apparatus and circuits
UEENEEG063A	Arrange circuits, control and protection for general electrical installations
UEENEEG101A	Solve problems in electromagnetic devices and related circuits
UEENEEG102A	Solve problems in low voltage a.c. circuits
UEENEEG106A	Terminate cables, cords and accessories for low voltage circuits

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 4 Writing 4 Numeracy 4

Employability Skills Information

Employability Skills **5)**

This unit contains Employability Skills.

The required outcomes described in this unit of competency contain applicable facets of Employability

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Employability Skills	**5)** Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and prepare for the work.	1.1 Work requirements are identified from work orders or equivalent and clarified and confirmed with appropriate parties or by site inspection.
	1.2 Occupational Health and Safety standards, statutory requirements, relevant Australian standards, codes of practice, manufacturers' specifications, environmental requirements and enterprise procedures are identified, applied and monitored throughout the work procedure.
	1.3 Resources required to satisfy the work plan are identified, obtained and inspected for compliance with the job specifications.
	1.4 Relevant plans, drawings and texts are selected and interpreted in accordance with the work plan.
	1.5 Correct size, type and quantity of materials and components are determined, obtained and inspected for compliance with the job specifications.
	1.6 Commissioning is planned in detail including sequencing and prioritising and considerations made, where appropriate, for the maintenance of

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ELEMENT	PERFORMANCE CRITERIA	
		plant security and capacity in accordance with system/site requirements.
	1.7	Coordination requirements, including requests for isolations where appropriate, are resolved with others involved, affected or required by the work.
	1.8	Potential hazards are identified and control measures are implemented.
	1.9	Work area is accessed and prepared in accordance with work requirements and site procedures.
	1.10	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training.
2 Test systems equipment.	2.1	Required isolations are confirmed where appropriate in accordance with site requirements.
	2.2	System equipment is visually inspected to ensure absence of any damage, defects and/or signs of deterioration in accordance with the commissioning plan.
	2.3	System equipment is tested in conjunction with other related systems and equipment to ensure correct operation in accordance with the commissioning plan.
	2.4	Wiring systems are checked and tested in conjunction with other related systems and equipment in accordance with the commissioning plan.
3 Test the system.	3.1	Required isolations are confirmed where appropriate in accordance with site requirements.
	3.2	System plant and equipment is set up and calibrated in accordance with operational requirements/manufacturer specifications.
	3.3	System is set up and calibrated in accordance with operational requirements/manufacturer

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ELEMENT	PERFORMANCE CRITERIA	
		specifications.
	3.4	System is commissioned using appropriate plans, drawings and texts in accordance with the commissioning plan.
	3.5	System is commissioned in conjunction with other related systems and equipment in accordance with the commissioning plan.
	3.6	Equipment is commissioned with due regard being paid to plant security and capacity in accordance with the commissioning plan.
	3.7	Faulty equipment is repaired or reported in accordance with site/enterprise procedures.
	3.8	Final job inspection is carried out and permits relinquished as required in accordance with the commissioning plan.
4 Complete the work.	4.1	Commissioning is completed and appropriate personnel notified in accordance with site/enterprise requirements.
	4.2	Work area is cleared of waste, cleaned, restored and secured in accordance with site/enterprise procedures.
	4.3	Plant, tools and equipment are maintained and stored in accordance with site/enterprise procedures.
	4.4	Work completion details are finalised in accordance with site/enterprise procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

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REQUIRED SKILLS AND KNOWLEDGE

KS01-PM436B Test and commission wind turbine generators

Evidence shall show that knowledge has been acquired of testing and commissioning wind turbine generator to the extent indicated by the following aspects:

- T1. Manufacturer and/or enterprise Test and Commission procedure and practices
- T2. Installation and commissioning software
- T3. Interconnection of test and commissioning hardware with WTG equipment
- T4. Advanced knowledge of manufacturer-specific WTG components, such as
  - • Generators
  - • Converter systems
  - • Pitch frequency converters
  - • Soft starters
  - • Generator slip systems
  - • Compensation systems
-

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the range statement of the competency standard unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace; however, it must be in accord

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with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated:

- On at least two (2) occasions, In accordance with the "Assessment Guidelines" for the UEP12 Training Package.

Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframe typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and range; and
  - Apply sustainable energy principles and practices as

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specified in the Performance Criteria and range; and

- Demonstrate an understanding of the required skills and knowledge as described in this unit to such an extent that the learner's performance outcome is reported in accordance with the preferred approach; namely a percentile graded result, where required by the regulated environment; and
- Demonstrate an appropriate level of employability skills; and
- Conduct work observing the relevant Anti Discrimination legislation, regulations, policies and workplace procedures; and

Demonstrated performance across a representative range of contexts from the prescribed items below:

A	All of the following: Accessing main controller or pitch frequency converter software
B	All of the following: Terminating LV cables
C	All of the following: Generator alignment
D	All of the following: Blade calibration
E	All of the following: Pitch or yaw brake calibration
F	All of the following: Deal with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a

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workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

These should be used in the formal learning/assessment environment.

Note:

Where simulation is considered a suitable strategy for assessment, conditions must be authentic and as far as possible reproduce and replicate the workplace and be consistent with the approved industry simulation policy.

The resources used for assessment should reflect current industry practices in relation to:

- Test and commission wind turbine generators

Method of assessment

9.4)

This unit shall be assessed by methods given in 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

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Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Inspection should be planned with the appropriate parties to determine access, conditions and work requirements.

WTG systems may include blade pitch systems, weather monitoring systems, converters, generator slip systems, compensation systems, safety chain systems, generators, gearboxes, and yaw control systems.

WTG communication systems may include: TCP/IP network, Ethernet, fibre optic, wireless, Fieldbus (IEC 61158), FASTBUS (IEEE 960-1986), CANCOMM, HART communication protocol, PROFIBUS, internet and hard wired.

WTG control systems may include one or a combination of: electronic systems, distributive control systems, SCADA, electrical systems, pneumatic systems, hydraulic systems, mechanical systems and PLC systems.

Equipment and components may include: circuit boards, circuit breakers, transformers, rectifiers, , inverters, pressure sensors, power factor correction circuitry, resistors, electric motors, control cabinets, protection equipment, transmitters, switches, temperature sensors, indicators, meters, proximity switches, encoders, resolvers, thyristors, fire detectors, smoke detectors and vibration sensors, fibre optic cables, Category 5 and 6 communication cables, wireless transmitters and receivers fuses, circuit breakers, timers, contactors, contacts, coils, relays, inductors, capacitors, bridge rectifiers, diodes, heat sinks, solenoids, overloads, plug in printed circuit boards, switches, plugs, cables and thermistors.

Fixed wiring tests can refer to: voltage, resistance, current, polarity, loop impedance, insulation resistance and continuity tests.

Materials may refer to: insulation tapes, heat shrink, sleeving, spiral binding, cable ties, solder, lubricants, oil, greases, and sealants, cleaning chemicals, lugs, connectors, terminal blocks, cable markers and identification labels.

Tools, equipment and test and measurement instruments may include: multimeter, frequency counter, frequency generator, hand tools, power tools, lifting equipment, laser alignment tools and specialised test equipment.

Fault indicators may include: self test systems, software logs, indication lamps, alarms and flag relays.

Setup and calibrate may include loading software, setting parameters, energising components, checking tension, checking alignments, calibrating brakes, setting north points, terminating cables, cleaning, removal of packaging, filling automatic lubrication systems

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RANGE STATEMENT

Work may be performed in service or out of service.

Work completion details may include: plant and maintenance records, warranty documents job cards, check sheets, punch lists and on device labelling updates.

Work site environment may be affected by weather or nearby animals, plant or processes, eg heat, noise, dust, oil, cattle, farm animals, native animals, snakes, water, height and chemicals.

Isolations can refer to electrical, mechanical or other associated processes.

Large Scale Wind Generators (WTGs) include systems having a rating of greater than 10 kW

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Maintenance

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UEPMNT501B Diagnose and repair faults in electrical and electronic systems

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to diagnose and repair faults in electrical/electronic systems.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit may require an electrical licence to practice in the workplace.

Practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
UEPMNT410B	Diagnose and Repair Faults in Electronic Equipment
UEPMNT411B	Diagnose and Repair Faults in Complex Electrical Equipment
UEENEEG108A	Trouble-shoot and repair faults in low voltage electrical apparatus and circuits
UEENEEE101A	Apply Occupational Health Safety regulations, codes and practices in the workplace
UEENEEE102A	Fabricate, dismantle, assemble of utilities industry components
UEENEEE104A	Solve problems in d.c. circuits
UEENEEE105A	Fix and secure electrotechnology equipment
UEENEEE107A	Use drawings, diagrams, schedules, standards, cords and specifications
UEENEEG006A	Solve problems in single and three phase low voltage machines
UEENEEG033A	Solve problems in single and three phase low voltage electrical apparatus and circuits
UEENEEG063A	Arrange circuits, control and

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Prerequisite Unit(s) **4)**

	protection for general electrical installations
UEENEEG101A	Solve problems in electromagnetic devices and related circuits
UEENEEG102A	Solve problems in low voltage a.c. circuits
UEENEEG106A	Terminate cables, cords and accessories for low voltage circuits

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 5 Writing 5 Numeracy 5

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Plan and prepare for the work	1.1	Work requirements are identified from request/work orders or equivalent and clarified/confirmed with appropriate parties or by site inspection
	1.2	Occupational Health and Safety standards, statutory requirements, relevant Australian standards, codes of practice, manufacturers' specifications, environmental requirements and enterprise procedures are identified, applied and monitored throughout the work procedure
	1.3	Resources required to satisfy the work plan are identified, obtained and inspected for compliance with the job specifications
	1.4	Relevant plans, drawings and texts are selected and interpreted in accordance with the work plan
	1.5	Correct size, type and quantity of materials/components are determined, obtained and inspected for compliance with the job specifications
	1.6	Work is planned in detail including sequencing and prioritising and considerations made, where appropriate, for the maintenance of plant security and capacity in accordance with system/site requirements
	1.7	Co-ordination requirements, including requests for isolations where appropriate, are resolved with others involved, affected or required by the work
	1.8	Potential hazards are identified and prevention and/or control measures are selected in accordance with the work plan and site procedures
	1.9	Work area is prepared in accordance with work requirements and site procedures

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ELEMENT	PERFORMANCE CRITERIA	
	1.10	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2 Verify the fault	2.1	Normal performance and function of the system is ascertained by consulting appropriate reference sources in accordance with the work plan
	2.2	Fault indicators and appropriate technical information/diagnostic techniques are used to verify reported symptoms/faults in accordance with the work plan
	2.3	Symptoms are reproduced and monitored if possible, whilst due regard for personnel safety and plant security is observed in accordance with the work plan
3 Find the fault	3.1	Required isolations are confirmed where appropriate in accordance with site requirements
	3.2	Fault finding is carried out in conjunction with others involved in, or affected by the work in accordance with enterprise/job requirements
	3.3	Equipment, components, wires, cables, terminations and support fixings are inspected for obvious faults in accordance with the work plan
	3.4	All appropriate fault finding/diagnostic techniques are identified, selected and used to determine the fault in accordance with the work plan
	3.5	All appropriate equipment/components are disconnected to enable accurate test measurements of suspected faulty components without the concern of "back feed" readings in accordance with the work plan
	3.6	Test and measurement instruments are used in accordance with manufacturer’s instructions and job requirements

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ELEMENT	PERFORMANCE CRITERIA
4 Determine cause of fault	4.1 All appropriate personnel are consulted in order to obtain as many details relating to the faulty system as possible in accordance with the work plan
	4.2 Appropriate use is made of any information from fault indicators and maintenance records in accordance with the work plan
	4.3 Valid conclusions about the nature and cause of the fault are reached from analysis of available evidence in accordance with the work plan
5 Repair or rectify the fault	5.1 Required isolations are confirmed where appropriate in accordance with site requirements
	5.2 Appropriate repair procedures are undertaken in conjunction with others involved in, or affected by, the work in accordance with the work plan
	5.3 Faulty, worn, damaged or unsecured equipment/components are replaced, repaired or secured in accordance with the work plan
	5.4 Parts and components are selected and replaced as required in accordance with appropriate specifications and the work plan
	5.5 Equipment/components disconnected for testing are reconnected having been proven free of faults and all terminations are then checked to ensure they are electrically and mechanically sound in accordance with the work plan
	5.6 All faults are repaired or rectified in accordance with the work plan
	5.7 Final job inspection is performed and permits are relinquished as required in accordance with the work plan
6 Complete the work	6.1 Work is completed and appropriate personnel notified in accordance with site/enterprise requirements

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired diagnosing and repairing faults in electrical and electronic systems.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PM501B Diagnose and repair faults in electrical and electronic systems

Evidence shall show that knowledge has been acquired for safe working practices of:

T1 Relevant Environmental, Occupational Health and Safety legislation and regulations

T2 Relevant plant and equipment, its location and operation

T3 Technical drawings and manufacturers manuals

T4 Typical arrangements of power production plant

T5 Relevant state and territory regulations

T6 Relevant Australian standards

T7 Equipment and material required to perform the work

T8 Isolation procedures

T9 Layout of plant/work site and operation of its equipment

T10 Fault finding and diagnostic techniques

T11 Repair techniques

T12 Plant electronic and electrical systems

T13 Electronic principles

T14 Electrical principles

T15 Test and measurement instruments

T16 Engineering and electronic workshop practice

KS02-PM501B Diagnose and repair faults in electrical and electronic systems

Specific skills needed to achieve the Performance Criteria:

T1 Apply Relevant Environmental, Occupational Health and Safety legislation and regulations

T2 Interpret Technical drawings and manufacturers manuals

T3 Apply relevant state and territory regulations

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REQUIRED SKILLS AND KNOWLEDGE

T4 Apply electronic principles

T5 Apply relevant Australian standards

T6 Use tools and relevant equipment

T7 Use test and measurement instruments

T8 Verify and identify faults

T9 Use appropriate fault finding and diagnostic techniques

T10 Repair faults

T11 Select materials for the job

T12 Apply electrical principles

T13 Communicate effectively

T14 Apply data analysis techniques and tools

T15 Apply engineering and electronic workshop practices

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of the competency standard unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full

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can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement

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- Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
- Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
- Demonstrate an appropriate level of employability skills
- Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures

- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Preparation and planning of work
  - Verification techniques
  - Diagnostic and fault finding techniques and procedures associated with electrical work
  - Repair techniques and procedures
  - Completion of work procedures
  - Dealing with an unplanned event by drawing on Essential Knowledge and Skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

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In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and method and in a variety of environments.

Method of assessment

9.4)

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note: Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the Essential Knowledge and Skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Inspection should be planned with the appropriate parties to determine access, conditions and work requirements.

Systems can refer to furnace safeguard supervision system, gas turbine control system, water ingress protection system, ashing system, water treatment plant control system,

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RANGE STATEMENT

conveyor systems, sootblower system, generator cooling system, generator excitation system, annunciator system and flame surveillance system, emergency shutdown systems, turbine compressor set control systems, compressor station control systems, gas engine alternator control systems, bore control systems, distributive control systems and complex fire/security systems.

Materials may refer to fixings, lubricants, cleaning solvents, contact cleaners, emery paper, grease, oil, connectors, terminal blocks, lugs, solder, adhesives, insulation tape, heat shrink and sealants.

Components may refer to transformers, switchboards, control panels, PLC's, motor starters, motor operated valves, battery chargers, power supplies and annunciators.

Test and measurement instruments may refer to multimeters, tong testers, insulation resistance/continuity tester, ductor tester, overload injection tester, cathode ray oscilloscope, variac, hand held programmer, logic probe and recorders.

Fault finding and diagnostic techniques can refer to linear approach, half split rule, sensory detection, loop test, insulation/resistance and continuity tests.

Fault indicators can refer to indication lamps LEDs, VDUs alarms and flag relays.

Work may be performed with system on line.

Work completion details may include plant and maintenance records, job cards, check sheets and on device labelling updates.

Work site environment may be affected by nearby plant or processes, e.g. heat, noise, dust, oil, water and chemical.

Isolations can refer to electrical/mechanical or other associated processes.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Maintenance.

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UEPMNT502B Test and commission electronic electrical systems

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to conduct testing and commissioning of electrical/electronic systems. Systems can refer to a combination of electrical/electronic machinery/equipment.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit may require an electrical licence to practice in the workplace.

Practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
UEPMNT352B	Test and commission electronic electrical equipment
UEENEEG108A	Trouble-shoot and repair faults in low voltage electrical apparatus and circuits
UEENEEE101A	Apply Occupational Health Safety regulations, codes and practices in the workplace
UEENEEE102A	Fabricate, dismantle, assemble of utilities industry components
UEENEEE104A	Solve problems in d.c. circuits
UEENEEE105A	Fix and secure electrotechnology equipment
UEENEEE107A	Use drawings, diagrams, schedules, standards, cords and specifications
UEENEEG006A	Solve problems in single and three phase low voltage machines
UEENEEG033A	Solve problems in single and three phase low voltage electrical apparatus and circuits
UEENEEG063A	Arrange circuits, control and protection for general electrical installations

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Prerequisite Unit(s) **4)**

UEENEEG101A	Solve problems in electromagnetic devices and related circuits
UEENEEG102A	Solve problems in low voltage a.c. circuits
UEENEEG106A	Terminate cables, cords and accessories for low voltage circuits

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 5 Writing 5 Numeracy 5

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and prepare for the work	1.1 Work requirements are identified from request/work orders or equivalent and clarified/confirmed with appropriate parties or by site inspection
	1.2 Occupational Health and Safety standards, statutory requirements, relevant Australian standards, codes of practice, manufacturers' specifications, environmental requirements and enterprise procedures are identified, applied and monitored throughout the work procedure
	1.3 Resources required to satisfy the work plan are identified, obtained and inspected for compliance with the job specifications
	1.4 Relevant plans, drawings and texts are selected and interpreted in accordance with the work plan
	1.5 Correct size, type and quantity of materials/components are determined, obtained and inspected for compliance with the job specifications
	1.6 Work is planned in detail including sequencing and prioritising and considerations made, where appropriate, for the maintenance of plant security and capacity in accordance with system/site requirements
	1.7 Co-ordination requirements, including requests for isolations where appropriate, are resolved with others involved, affected or required by the work
	1.8 Potential hazards are identified and prevention and/or control measures are selected in accordance with the work plan and site procedures
	1.9 Work area is prepared in accordance with work requirements and site procedures
	1.10 Where appropriate, the teams and individuals roles and responsibilities within the team are

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ELEMENT	PERFORMANCE CRITERIA	
		identified and, where required, assist in the provision of the on-the-job training
2 Test wiring systems	2.1	Required isolations are confirmed where appropriate in accordance with site requirements
	2.2	Wiring systems are tested using appropriate plans, drawings and texts in accordance with the work plan
	2.3	Wiring systems are tested in conjunction with others involved in, or affected by, the work in accordance with the work plan
	2.4	Wiring systems, including enclosures/supports, are inspected prior to testing to ensure absence of any damage, defects and/or signs of deterioration in accordance with the work plan
	2.5	Fixed wiring is tested as appropriate and results/observations are interpreted and documented to confirm compliance with job specifications.
3 Test the systems	3.1	Required isolations are confirmed where appropriate in accordance with site requirements
	3.2	Equipment is tested using appropriate plans, drawings and texts in accordance with the work plan
	3.3	System and equipment is tested in conjunction with other involved in, or affected by, the work in accordance with the work plan
	3.4	Required test conditions are confirmed and the equipment is inspected to ensure absence of any damage, defects and/or signs of deterioration in accordance with the work plan
	3.5	System and equipment is tested using appropriate test techniques in accordance with the work plan
	3.6	System test results/observations are interpreted and documented to confirm compliance with job specifications

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ELEMENT	PERFORMANCE CRITERIA	
4 Commission the systems	4.1	Required isolations are confirmed where appropriate in accordance with site requirements
	4.2	System is commissioned using appropriate plans, drawings and texts in accordance with the work plan
	4.3	System is commissioned in conjunction with others involved in, or affected by, the work in accordance with the work plan
	4.4	System and equipment is set up in accordance with operational requirements/manufacturer's specifications
	4.5	Testing and monitoring procedures are followed and results monitored, interpreted and documented to ensure equipment operates/functions within specifications
	4.6	System is commissioned with due regard being paid to plant security and capacity in accordance with the work plan
	4.7	Final job inspection is carried out and permits relinquished as required in accordance with the work plan
5 Complete the work	5.1	Work is completed and appropriate personnel notified in accordance with site/enterprise requirements
	5.2	Work area is cleared of waste, cleaned, restored and secured in accordance with site/enterprise procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired testing and commissioning

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REQUIRED SKILLS AND KNOWLEDGE

electronic electrical systems.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PM502B Test and commission electronic electrical systems

Evidence shall show that knowledge has been acquired for safe working practices of:

T1 Relevant Environmental, Occupational Health and Safety legislation and regulations

T2 Relevant plant and equipment, its location and operation

T3 Technical drawings and manufacturers manuals

T4 Typical arrangements of power production plant

T5 Relevant state and territory regulations

T6 Electronic principles

T7 Relevant Australian standards

T8 Equipment and material required to perform the work

T9 Isolation procedures

T10 Layout of plant/work site and operation of its equipment

T11 Testing and commissioning techniques and procedures

T12 Operational requirements of the equipment

T13 Plant electronic and electrical systems

T14 Electrical principles

T15 Test and measurement instruments

T16 Circuit plan appreciation

T17 Engineering and electronic workshop practice

KS02-PM502B Test and commission electronic electrical systems

Specific skills needed to achieve the Performance Criteria:

T1 Apply Relevant Environmental, Occupational Health and Safety legislation and regulations

T2 Interpret Technical drawings and manufacturers manuals

T3 Apply relevant state and territory regulations

T4 Apply electronic principles

T5 Apply relevant Australian standards

T6 Use tools and relevant equipment

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REQUIRED SKILLS AND KNOWLEDGE

T7 Use test and measurement instruments

T8 Inspect and test the wiring systems

T9 Inspect, test and monitor systems

T10 Commission electronic/electrical system

T11 Select materials for the job

T12 Apply electrical principles

T13 Communicate effectively

T14 Apply data analysis techniques and tools

T15 Apply engineering and electronic workshop practices

Evidence Guide

EVIDENCE GUIDE

9) Evidence Guide: This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of the competency standard unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by

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various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge

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and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
- Demonstrate an appropriate level of employability skills
- Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures

- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Preparation and planning of work
  - Testing techniques
  - Commissioning procedures
  - Completion of work procedures
  - Dealing with an unplanned event by drawing on Essential Knowledge and Skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and method and in a variety of environments.

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Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note: Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the Essential Knowledge and Skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Inspection should be planned with the appropriate parties to determine access, conditions and work requirements.

Systems can refer to furnace safeguard supervision system, gas turbine control system, water ingress protection system, ashing system, water treatment plant control system, conveyor systems, sootblower system, generator cooling system, generator excitation system, annunciator system and flame surveillance system, emergency shutdown systems, turbine compressor set control systems, compressor station control systems, gas engine alternator control systems, bore control systems, distributive control systems and complex fire/security systems.

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RANGE STATEMENT

Components may refer to transformers, switch boards, control panels, PLC's, motor starters, motor operated valves, battery chargers, power supplies and annunciators.

Test and measurement instruments may refer to multimeters, tong tester, insulation resistance/continuity tester, ductor tester, overload injection tester, growlers, cathode ray oscilloscope, variac, hand held programmer and logic probe.

Fixed wiring tests can refer to polarity, loop impedance and insulation resistance/continuity tests.

Monitoring equipment may include stopwatch, indication lamps, tachometer/rev counter, LED displays, VDUs, thermometers, mimic panels, position indicators, audio indicators and chart recorders.

Work may be performed with equipment on line.

Work completion details may include plant and maintenance records, job cards, check sheets and on device labelling updates.

Work site environment may be affected by nearby plant or process, e.g. heat, noise, dust, oil, water and chemical.

Isolations can refer to electrical/mechanical or other associated processes.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Maintenance.

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UEPMNT503B Diagnose and repair faults in instrumentation systems

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to diagnose and repair of instrumentation systems and all ancillary equipment including, but not limited to, PC operating systems, distributive control systems, programmable logic control systems, process control systems.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit may require an electrical licence to practice in the workplace.

Practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
UEPMNT427B	Diagnose and Repair Faults in Complex Instrumentation Equipment
UEPMNT357B	Diagnose and repair faults in instrumentation equipment
UEENEEI001B	Install and set up transducers and sensing devices
UEENEEE002B	Dismantle, assemble and fabricate electrotechnology components
UEENEEE005B	Fix and secure equipment
UEENEEE007B	Use drawings, diagrams, schedules and manuals

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 5 Writing 5 Numeracy 5

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Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and prepare for the work	1.1 Work requirements are identified from request/work orders or equivalent and clarified/confirmed with appropriate parties or by site inspection
	1.2 Occupational Health and Safety standards, statutory requirements, relevant Australian standards, codes of practice, manufacturers' specifications, environmental requirements and enterprise procedures are identified, applied and monitored throughout the work procedure
	1.3 Resources required to satisfy the work plan are identified, obtained and inspected for compliance with the job specifications
	1.4 Relevant plans, drawings and texts are selected and interpreted in accordance with the work plan
	1.5 Correct size, type and quantity of materials/components are determined, obtained and inspected for compliance with the job

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ELEMENT	PERFORMANCE CRITERIA	
		specifications
	1.6	Work is planned in detail including sequencing and prioritising and considerations made, where appropriate, for the maintenance of plant security and capacity in accordance with system/site requirements
	1.7	Coordination requirements, including requests for isolations where appropriate, are resolved with others involved, affected or required by the work
	1.8	Potential hazards are identified and prevention and/or control measures are selected in accordance with the work plan and site procedures
	1.9	Work area is prepared in accordance with work requirements and site procedures
	1.10	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2 Verify the fault	2.1	Normal performance and function of the system is ascertained by consulting appropriate reference sources in accordance with the work plan
	2.2	Fault indicators, appropriate technical information/diagnostic techniques are used to verify reported symptoms/faults in accordance with the work plan
	2.3	Symptoms are reproduced and monitored if possible, whilst due regard for personnel safety and plant security is observed in accordance with the work plan.
3 Find the fault	3.1	Required isolations are confirmed where appropriate in accordance with site requirements
	3.2	Fault finding is carried out in conjunction with others involved in, or affected by, the work in accordance with enterprise/job requirements

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ELEMENT		PERFORMANCE CRITERIA	
		3.3	System equipment, components, wires, cables, terminations and support fixings are inspected for obvious faults in accordance with the work plan
		3.4	All appropriate fault finding/diagnostic techniques are identified, selected and used to determine the fault in accordance with the work plan
		3.5	All appropriate components are disconnected to enable accurate test measurements of suspected faulty components without the concern of "back feed" readings in accordance with the work plan
		3.6	Test and measurement instruments are used in accordance with manufacturer's instructions and job requirements
4	Determine cause of fault	4.1	All appropriate personnel are consulted in order to obtain as many details relating to the faulty equipment as possible in accordance with the work plan
		4.2	Appropriate use is made of any information from fault indicators and maintenance records in accordance with the work plan
		4.3	Valid conclusions about the nature and cause of the fault are reached from analysis of available evidence in accordance with the work plan
5	Repair or rectify the fault	5.1	Required isolations are confirmed where appropriate in accordance with site requirements
		5.2	Appropriate repair procedures are undertaken in conjunction with others involved in, or affected by, the work in accordance with the work plan
		5.3	Faulty, worn, damaged or unsecured equipment/components are replaced, repaired or secured in accordance with the work plan
		5.4	Parts and components are selected and replaced as required in accordance with appropriate specifications and the work plan

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ELEMENT	PERFORMANCE CRITERIA	
	5.5	Equipment/components disconnected for testing are reconnected having been proven free of faults and all terminations are then checked to ensure they are electrically and mechanically sound in accordance with the work plan
	5.6	All faults are repaired or rectified in accordance with the work plan
	5.7	Final job inspection is performed and permits are relinquished as required in accordance with the work plan
6 Complete the work	6.1	Work is completed and appropriate personnel notified in accordance with site/enterprise requirements
	6.2	Work area is cleared of waste, cleaned, restored and secured in accordance with site/enterprise procedures
	6.3	Plant, tools and equipment are maintained and stored in accordance with site/enterprise procedures
	6.4	Work completion details are finalised in accordance with site/enterprise procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired diagnosing and repair faults in instrumentation systems.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PM503B Diagnose and repair faults in instrumentation systems

Evidence shall show that knowledge has been acquired for safe working practices of:

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REQUIRED SKILLS AND KNOWLEDGE

T1 Relevant Environmental, Occupational Health and Safety legislation and regulations

T2 Relevant plant and equipment, its location and operation

T3 Technical drawings and manufacturers manuals

T4 Typical arrangements of power production plant

T5 Relevant state and territory regulations

T6 Instrumentation principles and practices

T7 Instrument calibration techniques

T8 Electronic principles

T9 Relevant Australian standards

T10 Equipment and material required to perform the work

T11 Isolation procedures

T12 Plant instrument systems

T13 Repair techniques

T14 Regulatory aspects

T15 Electrical fundamentals

T16Test and measurement instruments

T17 Engineering and workshop practice

T18 Distributed control systems

T19 Programmable logic controller

KS02-PM503B Diagnose and repair faults in instrumentation systems

Specific skills needed to achieve the Performance Criteria:

T1 Apply Relevant Environmental, Occupational Health and Safety legislation and regulations

T2 Interpret Technical drawings and manufacturers manuals

T3 Apply relevant state and territory regulations

T4 Apply electronic principles

T5 Apply instrumentation principles and practices

T6 Apply instrument calibration techniques

T7 Apply relevant Australian standards

T8 Carry out work in a logical and safe manner

T9 Use tools and relevant equipment

T10 Use test and measurement instruments

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REQUIRED SKILLS AND KNOWLEDGE

T11 Verify and identify faults

T12 Use appropriate fault finding and diagnostic techniques

T13 Determine the cause of faults

T14 Repair faults

T15 Identify and select materials for the job

T16 Apply regulatory aspects theory

T17 Apply electrical fundamentals theory

T18 Carry out work completion details

T19 Communicate effectively

T20 Apply data analysis techniques and tools.

Evidence Guide

EVIDENCE GUIDE

9) Evidence Guide: This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of the competency standard unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord

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with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as

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specified in the Performance Criteria and Range Statement
    - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
    - Demonstrate an appropriate level of employability skills
    - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
    - Evidence of recognition of potential hazards in the workplace.
    - Evidence that symbols are identified and used for Occupational Health and Safety signs.
    - Dealing with an unplanned event by drawing on Essential Knowledge and Skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.
    - Knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
    - Preparation and planning of work, Verification techniques, Diagnostic and fault finding techniques and procedures associated with electrical work,, Repair techniques and procedures, Completion of work procedures

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

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In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and method and in a variety of environments.

Method of assessment

9.4)

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the Essential Knowledge and Skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Inspection should be planned with the appropriate parties to determine access, conditions and work requirements.

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RANGE STATEMENT

Systems can refer to boiler automatic control systems, furnace safeguard supervision system, gas turbine control system, water ingress protection system, ashing system, water treatment plant control system, conveyor systems, sootblower system, generator cooling system, generator excitation system, annunciator system and flame surveillance system, emergency shutdown systems, turbine compressor set control systems, compressor station control systems, gas turbine generator control systems, bore control systems, distributive control systems and complex fire/security systems.

Materials may include cables, solder/flux, lubricants, cleaning solvents, contact cleaners, connectors, adhesive and sealants.

Components may include power supplies, relays, PLC input/output blocks, printed circuit boards, protection devices, switches, transformers, servo valves, positioners, converters, controllers, function cards and transmitters.

Test and measurement instruments may include multimeter, decade box, d.c. I/V standard, potentiometer, hand-held communicator/programmer, frequency counter, function generator, CRO, LCR bridge, logic analyser and specialised test equipment.

Fault finding and diagnostic techniques may include linear approach, half split rule, sensory detection, insulation/resistance and continuity tests.

Fault indicators may include indication lamps, LED’s, alarms and flag relays.

Work may be performed with system on line

Work completion details may include plant and maintenance records, job cards, check sheets and on device labelling updates.

Work site environment may be affected by nearby plant or processes, e.g. heat, noise, dust, oil, water and chemical.

Isolations can refer to electrical/mechanical or other associated processes.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Maintenance.

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UEPMNT504B Test and commission instrumentation systems

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to conduct testing and commissioning of instrumentation systems and all ancillary equipment including, but not limited to, PC operating systems, distributive control systems, programmable logic control systems, process control systems.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit may require an electrical licence to practice in the workplace.

Practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
UEPMNT430B	Test and Commission Complex Instrumentation Equipment
UEPMNT359B	Test and Commission Instrumentation Systems
UEENEEI001B	Install and set up transducers and sensing devices
UEENEEE002B	Dismantle, assemble and fabricate electrotechnology components
UEENEEE005B	Fix and secure equipment
UEENEEE007B	Use drawings, diagrams, schedules and manuals

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 5 Writing 5 Numeracy 5

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Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and prepare for the work	1.1 Work requirements are identified from request/work orders or equivalent and clarified/confirmed with appropriate parties or by site inspection
	1.2 Occupational Health and Safety standards, statutory requirements, relevant Australian standards, codes of practice, manufacturers' specifications, environmental requirements and enterprise procedures are identified, applied and monitored throughout the work procedure
	1.3 Resources required to satisfy the work plan are identified, obtained and inspected for compliance with the job specifications
	1.4 Relevant plans, drawings and texts are selected and interpreted in accordance with the work plan
	1.5 Correct size, type and quantity of materials/components are determined, obtained and inspected for compliance with the job

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ELEMENT	PERFORMANCE CRITERIA	
		specifications
	1.6	Work is planned in detail including sequencing and prioritising and considerations made, where appropriate, for the maintenance of plant security and capacity in accordance with system/site requirements
	1.7	Coordination requirements, including requests for isolations where appropriate, are resolved with others involved, affected or required by the work
	1.8	Potential hazards are identified and prevention and/or control measures are selected in accordance with the work plan and site procedures
	1.9	Work area is prepared in accordance with work requirements and site procedures
	1.10	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2 Test wiring systems	2.1	Required isolations are confirmed where appropriate in accordance with site requirements
	2.2	Wiring systems are tested using appropriate plans, drawings and texts in accordance with the work plan
	2.3	Wiring systems are tested in conjunction with others involved in, or affected by, the work in accordance with the work plan
	2.4	Wiring systems, including enclosures/ supports, are inspected prior to testing to ensure absence of any damage, defects and/or signs of deterioration in accordance with the work plan
	2.5	Fixed wiring is tested as appropriate and results/observations are interpreted and documented to confirm compliance with job specifications

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ELEMENT	PERFORMANCE CRITERIA	
3 Test piping and tubing systems	3.1	Required isolations are confirmed where appropriate in accordance with site requirements
	3.2	Piping and tubing systems are tested using appropriate plans, drawings and text in accordance with the work plan
	3.3	Piping and tubing systems are tested in conjunction with other involved in or affected by the work in accordance with the work plan
	3.4	Piping and tubing systems, including enclosures/supports, are inspected prior to testing to ensure absence of any damage, defects and/or signs of deterioration in accordance with the work plan
	3.5	Fixed piping and tubing is tested as appropriate and results/observations are interpreted and documented to confirm compliance with job specifications and the work plan
4 Test the system	4.1	Required isolations are confirmed where appropriate in accordance with site requirements
	4.2	System is tested using appropriate plans, drawings and text in accordance with the work plan
	4.3	System is tested in conjunction with other involved in or affected by the work in accordance with the work plan
	4.4	Required test conditions are confirmed and the System is inspected to ensure absence of any damage, defects and/or signs of deterioration in accordance with the work plan
	4.5	System is tested using appropriate test techniques in accordance with the work plan
	4.6	System test results/observations are interpreted and documented to confirm compliance with job specifications.
5 Commission the equipment	5.1	Required isolations are confirmed where appropriate in accordance with site requirements

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ELEMENT	PERFORMANCE CRITERIA	
	5.2	System is commissioned using appropriate plans, drawings and text in accordance with the work plan
	5.3	System is commissioned in conjunction with others involved in, or affected by, the work in accordance with the work plan
	5.4	System is set up in accordance with operational requirements/manufacturer's specifications
	5.5	Testing and monitoring procedures are followed and results monitored, interpreted and documented to ensure equipment operates/functions within specifications

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired testing and commissioning instrumentation systems.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PM504B Test and commission instrumentation systems

Evidence shall show that knowledge has been acquired for safe working practices of:

T1 Relevant Environmental, Occupational Health and Safety legislation and regulations

T2 Relevant plant and equipment, its location and operation

T3 Technical drawings and manufacturers manuals

T4 Introduction to and typical arrangements of power production plant

T5 Relevant state and territory regulations

T6 Instrumentation principles and practices

T7 Instrument calibration techniques

T8 Electronic principles

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REQUIRED SKILLS AND KNOWLEDGE

T9 Relevant Australian standards

T10 Equipment and material required to perform the work

T11 Isolation procedures

T12 General layout of plant/work site and operation of its equipment

T13 Operating principles of the equipment

T14 Testing and commissioning procedures and techniques

T15 Operational requirements of the equipment

T16 Plant Instrumentation systems

T17 Regulatory aspects

T18 Electrical fundamentals

T19 Test and measurement instruments

T20 Distributed control systems

T21 Programmable logic controller

KS02-PM504B Test and commission instrumentation systems

Specific skills needed to achieve the Performance Criteria:

T1 Apply Relevant Environmental, Occupational Health and Safety legislation and regulations

T2 Interpret Technical drawings and manufacturers manuals

T3 Apply relevant state and territory regulations

T4 Apply electronic principles

T5 Apply instrumentation principles and practices

T6 Apply instrument calibration techniques

T7 Apply relevant Australian standards

T8 Use tools and relevant equipment

T9 Use test and measurement instruments

T10 Inspect and test the wiring systems

T11 Inspect and test piping and tubing systems

T12 Inspect, test and monitor equipment

T13 Commission the system

T14Identify and select materials for the job

T15 Apply electrical fundamentals

T16 Carry out work completion details

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REQUIRED SKILLS AND KNOWLEDGE

T17 Update plans, drawings and text

T18 Communicate effectively

T19Apply data analysis techniques and tools.

Evidence Guide

EVIDENCE GUIDE

9) Evidence Guide: This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of the competency standard unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence

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need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Knowledge and application of relevant sections of:

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Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures

- Preparation and planning of work
- Testing techniques associated with electrical work
- Commissioning techniques and procedures
- Completion of work procedures
- Dealing with an unplanned event by drawing on Essential Knowledge and Skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and method and in a variety of environments.

Method of assessment

9.4)

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

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Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the Essential Knowledge and Skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Inspection should be planned with the appropriate parties to determine access, conditions and work requirements.

Systems can refer to boiler automatic control systems, furnace safeguard supervision system, gas turbine control system, water ingress protection system, ashing system, water treatment plant control system, conveyor systems, sootblower system, generator cooling system, generator excitation system, annunciator system and flame surveillance system, emergency shutdown systems, turbine compressor set control systems, compressor station control systems, gas turbine generator control systems, bore control systems, distributive control systems and complex fire/security systems.

Wiring systems can refer to cords and cables such as flexible multi-core, thermocouple, coxial, ribbon and hook up cable, signal and data cable, ducts such as PVC and metal, trunking, condults and fittings such as PVC and metal (rigid and flexible) pipes, elbows, bends, tees, junction boxes, hose terminators, saddles, spacers, bushes, adaptors and locknuts, wire loom support, cable ties, unistrut, trays and ladder racks.

Piping and tubing systems may refer to piping/tubing, piping/tubing enclosures,

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RANGE STATEMENT

fittings and support systems.

Components may include power supplies, relays, PLC input/output blocks, printed circuit boards, protection devices, switches, transformers, servo valves, positioners, converters, controllers, function cards and transmitters.

Test and measurement instruments may include multimeter, standard gases, decade box, d.c., I/V standard, potentiometer, radiation meter, hand-held communicator/programmer, frequency counter, function generator, CRO, LCR bridge, logic analyser and specialised test equipment.

Fixed wiring tests can refer to polarity, loop impedance and continuity.

Fixed piping and tubing tests can refer to leak and continuity.

Monitoring equipment can refer to test recorder/data logger.

Work may be performed with equipment on-line.

Work completion details may include plant and maintenance records, job cards, check sheets and on device labelling updates.

Work site environment may be affected by nearby plant or processes, e.g. heat, noise, dust, oil, water and chemical.

Isolations can refer to electrical/mechanical or other associated processes.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Maintenance.

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UEPOPL001A Licence to operate a steam turbine

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit specifies the outcomes required to operate a steam turbine for licensing purposes, and covers the operation of any steam turbine (except a steam turbine that produces a power output of less than 500 kW) that:

- is multi-wheeled
- is capable of a speed greater than 3600 rpm, or
- uses attached condensers or a multi-staged heat exchange extraction process.

Application of the Unit

Application of the Unit **2)**

This unit requires the operator to plan the work, carry out pre-operational safety checks, start the steam turbine, monitor steam turbine operation, and shut-down the steam turbine.

This unit meets the requirements of the state and territory Work Health and Safety (WHS) Regulations, including licensing. Any alteration will result in a unit which is not acceptable to regulators for the purpose of licensing.

Licensing/Regulatory Information

License to practice **3)**

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading	Writing	Numeracy

Employability Skills Information

Employability Skills **5)**

This unit contains Employability Skills.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the

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competency standard unit Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Plan work	1.1 Type of operations to be conducted for steam turbine are assessed and prepared
	1.2 Steam turbine operations are planned according to procedures
	1.3 Personal protective equipment (PPE) is selected for use, ensuring statutory requirements and procedures are followed
	1.4 Hazards and potential hazards in work area are identified and assessed for risk, and controls recommended consistent with appropriate standards
	1.5 Appropriate communication methods are identified according to procedures.
2. Start-up steam turbine	2.1 Downstream user of output power from steam turbine is advised of start-up
	2.2 Controls are implemented for identified hazards and potential hazards in work area consistent with appropriate standards
	2.3 Availability of quality steam from upstream provider is confirmed
	2.4 Pre-operational safety checks of steam turbine are conducted according to procedures
	2.5 Start-up checks are performed upon ancillary plant
	2.6 Maintenance requirements are identified and reported according to procedures
	2.7 Steam turbine is started and brought up to speed and placed on line safely, according to procedures, including performance of start-up checks
3. Monitor steam turbine operation	3.1 Steam turbine is monitored according to required procedures, including performing of operational checks and fault finding
	3.2 Operating log is maintained clearly and accurately, according to established procedures

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ELEMENT	PERFORMANCE CRITERIA
	3.3 Operating status of steam turbine is diagnosed and verified
	3.4 Status of steam turbine is communicated to other operational personnel, including downstream users of steam turbine output power
	3.5 Steam turbine emergencies and contingencies are dealt with according to local workplace procedures, manufacturer's specifications and environmental requirements
4. Shutdown steam turbine	4.1 Energy isolation procedures are followed
	4.2 Routine shutdown of steam turbine is performed according to operational and manufacturer's requirements and procedures, including performing shutdown checks
	4.3 Maintenance requirements are identified, recorded and reported according to procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

T1 Required skills:

- Accurate recording and maintenance of information relating to operation of a steam turbine
- Compliance with legislation, regulations, standards, codes of practice and established safe practices and procedures for starting, operating, shutting down and maintaining a steam turbine
- Diagnostic and testing techniques as applied to steam turbines
- Efficient and safe conduct when starting, operating, shutting down and maintaining a steam turbine
- Use of appropriate communication techniques with colleagues and others.
- Use of relevant tools and equipment
- Verification of problems and steam turbine equipment faults and demonstrate appropriate response procedures

T2 Required knowledge:

- Basic principles of heat transfer and thermodynamics

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REQUIRED SKILLS AND KNOWLEDGE

- Commonwealth, state or territory WHS legislation, regulations, standards and codes of practice relevant to the full range of techniques for operating steam turbines
- Confined space awareness and the limits for entry into a confined space.
- Environmental protection requirements relating to the disposal of waste material and storage of environmentally hazardous materials
- Established communication channels and protocols in the workplace
- Safety data sheets and material handling methods
- Organisational and workplace standards, requirements, policies and procedures for starting, operating, shutting down and maintaining a steam turbine
- Procedures for the recording, reporting and maintenance of workplace records and information
- Understanding of the hierarchy of hazard identification and control
- Steam turbine capabilities and components
- Steam turbine fault finding and problem solving techniques
- Steam turbine operations and operating techniques
- Steam turbine safety devices and testing techniques
- System components and their interaction with other plant and equipment.
- Steam turbine speed control equipment
- Typical routine problems encountered in the process and with equipment and adjustments required for correction

Evidence Guide

EVIDENCE GUIDE

9) The evidence guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.

Overview of Assessment

9.1)

Successful assessment of this unit meets the competency requirement of state and territory WHS Regulations, including licensing.

State/territory WHS regulators have mandated the use of Assessment Instruments and Instructions for Assessment for this unit which have been endorsed by the national body responsible for WHS matters.

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Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Compliance with organisational and site policies and procedures including quality requirements and state or territory legislation applicable to workplace operations.

Compliance with WHS and environmental regulations, policies and procedures.

Effectively communicate and work safely with others in the work area.

Identify hazards associated with the operation of the steam turbine and put in place effective hazard controls for those hazards identified.

Effectively start-up, monitor and shutdown a steam turbine which meets the definition of this licence class.

Control and monitor any ancillary equipment which may be connected or interfaced to the steam turbine.

Compliance with Commonwealth, state or territory regulations for the acquisition of a regulatory authority licence.

Context of and specific resources for assessment

9.3)

Assessment of the safe and effective application of knowledge and skill to workplace tasks (performance) must be undertaken using the endorsed Assessment Instrument.

Assessment of performance must be undertaken either in the workplace or in a realistically simulated workplace.

Assessors must ensure that the assessment in the workplace is organised to ensure that all the required equipment and materials and a suitable working area is made available to suit the assessment and the workplace.

Assessment must occur under standard and authorised work practices, safety requirements and environmental constraints.

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Assessment is to comply with relevant appropriate standard requirements.

- Applicants must have access to:
  - PPE for the purpose of the Performance Assessment.
  - Appropriate safety equipment in safe condition
  - Appropriate steam turbine and associated equipment in safe condition
  - Communication equipment, where applicable.

Method of assessment

9.4)

Assessment must be conducted using the endorsed Assessment Instruments. These Instruments provide advice on their application.

The use of simulators in the assessment of this unit of competency is acceptable.

Assessment may be in conjunction with the assessment of other units of competency.

Assessment methods must confirm consistency and accuracy of performance together with application of underpinning knowledge.

Assessment must confirm a reasonable inference that competency is not only able to be satisfied under the particular circumstances, but is able to be transferred to other circumstances.

Concurrent assessment and relationship with other units

9.5)

Further information about endorsed Assessment Instruments may be obtained from state and territory WHS regulators.

Range Statement

RANGE STATEMENT

10) The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold

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RANGE STATEMENT

italicised wording, if used in the Performance Criteria, is detailed below.

Appropriate standards may include, but not be limited to: codes of practice; legislation; Australian standards, and manufacturers' specifications.

Communicated/Communication may include, but not be limited to: verbal; written; telephone; two-way radio; log records and computer record systems.

Emergencies may include, but not be limited to: fire; bomb threat; terrorism; personal accidents; chemical spills; major steam leaks; major water leaks and flooding and Natural disasters.

Fault may include, but not be limited to: abnormal operating conditions; loss of a major auxiliary; steam turbine water ingress; wet steam; excessively high turbine and turbine valves heating or cooling rates or differentials; loss of condenser vacuum; condenser tube leak; high dissolved oxygen; conductivity; high steam turbine bearing temperatures or vibration; high or low bearing oil temperatures; loss of steam turbine bearing oil flow or pressure; low or high pressure heaters malfunctions; actuator or valve mechanical or electrical faults or failure; instrument failure and steam turbine protection.

Hazards may include, but not be limited to: chemical hazards; thermal hazards; manual handling hazards; guarding of machinery requirements; illumination of work area; rubbish and combustibles in area; leakage of steam; leakage of fuel; obstructions in the work area; fire; noise; vibration; water and working at heights.

Operational checks may include, but not be limited to: quality of steam supply; cooling water system; condenser operation; position and operation of valves and fittings; cylinder drainage system; lubrication system, speed control, vibration level, steam reticulation line pressure, and operation of control/safety devices.

Personal Protective Equipment (PPE) may include, but not be limited to: prescribed under legislation, regulation, codes of practice, and workplace policies and practices; hard hat; safety boots; gloves; high visibility clothing; breathing, hearing, sight, skin and sun protection; fall-arrest equipment such as harnesses and lanyards, horizontal lines and inertia reel.

Pre-operational safety checks may include, but not be limited to: steam supply system; position and operation of steam turbine valves; safety devices; overspeed shut-down; pressure relieve devices; speed governor; exhaust system; auxiliary equipment and lubrication system.

Procedures may include, but not be limited to: manufacturer's guidelines (instructions, specifications or checklists); industry operating procedures and workplace procedures (work instructions, operating procedures, checklists).

Recorded may include, but not be limited to: operations and maintenance of steam turbine equipment; difficulties or issues; environmental issues; recommendations for future work; results; costs; hazards; incidents or injuries; dangerous occurrences or equipment malfunctions using log books; proformas; production reports and maintenance records.

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RANGE STATEMENT

A simulator is a device used especially in training to reproduce the conditions of the working situation, enabling tasks to be learned and practised safely and economically.

Shut down checks may include, but not be limited to: checks of cooling down process; steam supply isolated; load on steam turbine; auxiliary equipment shut-down; cylinder drain system and isolation from any common connection.

Start-up checks may include, but not be limited to: position and operation of valves and fittings; operation of lubrication system; operation of drainage system; steam quality; heat input; operation of auxiliary equipment; freedom of rotation of steam turbine; steam turbine warm up; operation of steam traps and steam line purge systems; warm up of reticulation system and reticulation line pressure.

All industrial equipment where steam acts on a steam turbine or rotor to cause a rotary motion with any or all of the following features: attached condensers; multi-wheeled; multi-staged heat exchange extraction process, and speed greater than 3600 rpm may include axial flow, back pressure, condensing, impulse, non-condensing, pass out, radial flow, reaction and velocity compounding steam turbines with a power output of greater than 500kW. The operation may be assisted by remote indicators of plant status and other parameters monitored (e.g. central control stations), in wet, noisy, dusty or hot areas or during continuous operation.

Steam turbine emergencies and contingencies may include, but not be limited to: identification of type of emergency; isolation of steam supply; selection and application of appropriate firefighting equipment; notification of upstream steam supplier and operation of steam turbine only when safe to do so.

Testing may include, but not be limited to: loss of a major auxiliary controls response checks; stand-by plant tests; valves operating checks; emergency governor operation test; performance tests and alarm and protection tests.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field 11)

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UEPOPL002A Licence to operate a reciprocating steam engine

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit specifies the outcomes required to operate a reciprocating steam engine for licensing purposes, which includes the operation of steam equipment where the steam acts upon a piston under pressure where this action of the steam forces the piston to move, including expanding (steam) reciprocating engines, with any piston diameter of greater than 250 millimetres.

Application of the Unit

Application of the Unit **2)**

This unit requires the operator to plan the work, carry out pre-operational safety checks, start the reciprocating steam engine, monitor the reciprocating steam engine operation, carry out shut-down of reciprocating steam engine for operational and maintenance purposes.

This unit meets the requirements of state and territory Work Health and Safety (WHS) Regulations, including licensing. Any alteration will result in a unit which is not acceptable to regulators for the purpose of licensing.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Not applicable.

Employability Skills Information

Employability Skills	**5)**
	This unit contains Employability Skills.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Plan work	1.1 Types of operations to be conducted for a reciprocating steam engine are assessed and prepared
	1.2 Personal protective equipment (PPE) is selected for use, ensuring statutory requirements and procedures are followed
	1.3 Hazards and potential hazards in work area are identified and assessed for risk, and controls recommended consistent with appropriate standards
	1.4 Pre-operational safety checks of reciprocating steam engine and equipment are conducted according to statutory requirements and procedures
	1.5 Maintenance requirements and equipment faults are identified and reported according to procedures
	1.6 Appropriate communication methods are identified according to procedures
2. Start reciprocating steam engine	2.1 Controls are implemented for identified hazards and potential hazards in work area consistent with appropriate standards

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ELEMENT	PERFORMANCE CRITERIA
	2.2 Start-up checks are performed and the reciprocating steam engine is brought on line safely, according to statutory requirements and procedures
	2.3 Maintenance requirements are identified and reported according to procedures
3. Monitor reciprocating steam engine operation	3.1 Reciprocating steam engine is monitored according to statutory requirements and workplace procedures, including undertaking operational checks
	3.2 Operating log is maintained clearly and accurately, according to statutory requirements and procedures
	3.3 Information regarding reciprocating steam engine, its status and operation is communicated clearly according to procedures
4. Shut-down reciprocating steam engine	4.1 Engine is shut down according to statutory requirements and procedures, including shut down checks and shut down checks for maintenance
	4.2 Reciprocating steam engine is isolated according to procedures
	4.3 Maintenance requirements are identified, recorded and reported according to procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

T1 Required skills:

- Accurate recording and maintenance of information relating to operation of a reciprocating steam engine
- Compliance with legislation, regulations, standards, codes of practice and established safe practices and procedures for starting, operating, shutting down and maintaining a reciprocating steam engine
- Diagnostic and testing techniques for reciprocating steam engines
- Efficient and safe conduct when starting, operating, shutting down and maintaining a reciprocating steam engine
- Use of appropriate communication techniques with colleagues and others

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REQUIRED SKILLS AND KNOWLEDGE

- Use of relevant tools and equipment
- Verification of problems and equipment faults and demonstrate appropriate response procedures

T2 Required knowledge:

- Basic principles of heat transfer and thermodynamics
- Commonwealth, state or territory WHS legislation, regulations, standards and codes of practice relevant to the full range of techniques for operating reciprocating steam engines
- Confined space awareness and the limits for entry into a confined space.
- Engine speed control equipment
- Environmental protection requirements relating to the disposal of waste material and storage of environmentally hazardous materials
- Established communication channels and protocols in the workplace
- Safety data sheets and material handling methods
- Organisational and workplace standards, requirements, policies and procedures for starting, operating, shutting down and maintaining a reciprocating steam engine
- Procedures for the recording, reporting and maintenance of workplace records and information
- Understanding of the hierarchy of hazard identification and control
- Reciprocating steam engine capabilities and components
- Reciprocating steam engine fault finding and problem solving techniques
- Reciprocating steam engine operations and operating techniques
- Reciprocating steam engine safety devices and testing techniques
- System components and their interaction with other plant and equipment
- Types of tools and equipment and procedures for their use, operation and maintenance
- Typical routine problems encountered in the process and with equipment and adjustments required for correction

Evidence Guide

EVIDENCE GUIDE

9) The evidence guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.

Overview of Assessment **9.1)**

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Successful assessment of this unit meets the competency requirement of state and territory WHS Regulations, including licensing.

State/territory WHS regulators have mandated the use of Assessment Instruments and Instructions for Assessment for this unit which have been endorsed by the national body responsible for WHS matters.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Compliance with organisational and site policies and procedures including quality requirements and state or territory legislation applicable to workplace operations.

Compliance with WHS and environmental regulations, policies and procedures.

Effectively communicate and work safely with others in the work area.

Identify hazards associated with the operation of the reciprocating steam engine and put in place effective hazard controls for those hazards identified.

Effectively start-up, monitor and shutdown a reciprocating steam engine that meets the definition of this licence class.

Compliance with Commonwealth, state or territory regulations for the acquisition of a regulatory authority licence.

Context of and specific resources for assessment

9.3)

Assessment of the safe and effective application of knowledge and skill to workplace tasks (performance) must be undertaken using the endorsed Assessment Instrument.

Assessment of performance must be undertaken either in the workplace or in a realistically simulated workplace.

Assessors must ensure that the assessment in the workplace is

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organised to ensure that all the required equipment and materials and a suitable working area is made available to suit the assessment and the workplace.

Assessment must occur under standard and authorised work practices, safety requirements and environmental constraints.

Assessment is to comply with relevant appropriate standard requirements.

- Applicants must have access to:
  - PPE for the purpose of the Performance Assessment
  - Appropriate safety equipment in safe condition
  - Appropriate reciprocating steam engine and associated equipment in safe condition
  - Communication equipment, where applicable.

Method of assessment **9.4)**

Assessment must be conducted using the endorsed Assessment Instruments. These Instruments provide advice on their application.

The use of simulators in the assessment of this unit of competency is not acceptable.

Assessment may be in conjunction with the assessment of other units of competency.

Assessment methods must confirm consistency and accuracy of performance together with application of underpinning knowledge.

Assessment must confirm a reasonable inference that competency is not only able to be satisfied under the particular circumstances, but is able to be transferred to other circumstances.

Concurrent assessment and relationship with other units **9.5)**

Further information about endorsed Assessment Instruments may be obtained from state and territory WHS regulators.

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Range Statement

RANGE STATEMENT

10) The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the Performance Criteria, is detailed below.

Appropriate standards may include, but not be limited to: codes of Practice; legislation; Australian standards and manufacturers' specifications.

Communicated/Communication may include, but not be limited to: verbal; written; telephone; two-way radio; log records and computer record systems.

Emergencies may include, but not be limited to: fire; bomb threat; terrorism; personal accidents; chemical spills; major steam leaks; major water leaks and flooding and natural disasters.

Equipment may include, but not be limited to: engine and auxiliary plant; engine lubrication and power or control oil systems; hydraulic oil system; pump; compressed air system; steam supply system; cylinder exhaust system; computers with equipment control functions; supervisory, alarm, protection and control equipment and Relevant maintenance equipment.

Also to include equipment for: lock out for protecting operators and co-workers from accidental injury; emergency shutdown stopping; extinguishing fires; organisational first aid requirements and evacuation.

Equipment faults may include, but not be limited to: abnormal operating conditions; loss of a major auxiliary; excessively high engine and engine valves heating rates or differentials; high engine bearing temperatures or vibration; high pressure heaters malfunctions; mechanical or electrical faults or failure and failed field devices and engine protection.

Hazards may include, but not be limited to: chemical hazards; thermal hazards; manual handling hazards; guarding of machinery requirements; illumination of work area; rubbish and combustibles in area; leakage of steam; leakage of fuel; obstructions in the work area; fire; noise; vibration; water and working at heights.

Operational checks may include, but not be limited to: supply and quality of steam and line pressure; exhaust system; safety devices; speed governor; vibration level; lubrication system; operation and function of valves and fittings; cylinder drainage system and operation of control/safety devices.

Personal Protective Equipment (PPE) may include, but not be limited to: prescribed under legislation, regulation, codes of practice, and workplace policies and practices; hard hat; safety boots; gloves; high visibility clothing; breathing, hearing, sight, skin and sun protection; fall-arrest equipment such as harnesses and lanyards, horizontal life lines and inertia reel.

Pre-operational safety checks may include, but not be limited to: supply steam system; position and operation of engine valves; lubrication system; cylinder drainage system; exhaust system; auxiliary equipment; safety devices; over speed shut down; pressure relief devices and speed governor.

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RANGE STATEMENT

Procedures may include, but not be limited to: manufacturer's guidelines (instructions, specifications or checklists); industry operating procedures and workplace procedures (work instructions, operating procedures, checklists).

The operation of steam equipment where the steam acts upon a piston under pressure where this action of the steam forces the piston to move. The definition includes all expanding (steam) reciprocating engines, with any piston diameter of greater than 250 millimetres.

Recorded may include, but not be limited to: operations and maintenance of reciprocating steam engine equipment; difficulties or issues; environmental issues; recommendations for future work; results; costs; hazards; incidents or injuries; dangerous occurrences or equipment; malfunctions using log books; proformas; production reports and maintenance records

Shut down checks may include, but not be limited to: steam supply; cooling process; load on engine; cylinder drains and auxiliary equipment.

Shut down checks for maintenance may include, but not be limited to: checks of cooling down process; isolation of steam; isolation from any common connection and opening of all access points required for inspection.

A simulator is a device used especially in training to reproduce the conditions of the working situation, enabling tasks to be learned and practised safely and economically.

Start-up checks May include, but not be limited to: heat input; steam supply system; steam traps and steam line purge systems operation; engine warmed up; lubrication system; drainage system; operation and position of engine valves and fittings; operation of auxiliary equipment; freedom of rotation of engine; warm up of reticulation system and reticulation line pressure.

TestingMay include, but not be limited to: loss of a major auxiliary controls response checks; stand-by plant "cut-in" tests; valves operating checks; on-load engine valve and emergency governor operation test; performance tests; valve operation tests and alarm and protection tests.

Unit Sector(s)

Not applicable.

Competency Field

Not applicable.

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UEPOPS202B Apply quality systems to work

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to apply the desired standards to work as specified within the quality system.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

Pre-Requisites

Prerequisite Unit(s) **4)**

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Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 2 Writing 2 Numeracy 2

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT		PERFORMANCE CRITERIA	
1	Plan and prepare for quality systems	1.1	Appropriate quality systems/procedures are identified from enterprise and/or site quality systems requirements
		1.2	Performance objectives are identified and agreed with the team leader in accordance with work plan
		1.3	Work plan is structured to ensure quality standards are achieved in accordance with site requirements
		1.4	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2	Apply quality systems and practices	2.1	Quality assurance systems and practices are implemented by the individual in accordance with manufacturer's/site requirements
		2.2	Work is monitored against agreed standards, sustainable energy principles and clarified with appropriate personnel in accordance with site requirements
		2.3	Allocated jobs or tasks are completed in accordance with team/enterprise quality requirements
3	Initiate changes to quality systems	3.1	Improvements and changes to quality procedures are identified by analysis of systems outcomes in accordance with site requirements
		3.2	Extent and nature of proposed changes to quality procedures are identified following investigation of enterprise/technical requirements in accordance with site requirements
		3.3	Proposed changes are negotiated and agreed with appropriate parties in accordance with site requirements

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence must show that knowledge has been acquired of safe working practices and enterprise quality management system.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

KS01-PO202B Enterprise quality management system, basic

Evidence shall show an understanding of enterprise quality management systems to an extent indicated by the following aspects:

T1 Quality Management Systems

- Purpose of a Quality Management System;
- Quality management system documentation, including work instructions (also known as work procedures or standard operating procedures), documentation templates, forms, and records;
    - Location of quality management system documentation and enterprise-based work instructions (including both hard-copy and electronic forms of documentation where appropriate);
    - Enterprise-based documentation and records including forms, records, databases

T2 Principles contained within the AS/NZS ISO 9001 quality management standard.

- Quality Assurance auditing principles, including external audits and internal audits

T3 Quality management tools and techniques, including the use and interpretation of:

- Flow charts;
- Cause-and-effect diagrams;
- Histograms;
- Run charts and graphs;
- Check sheets.

T4 Continuous improvement techniques

- Performance indicators;
- Techniques for generating improvement including quality circles, suggestion schemes, brainstorming

T5 Communication in a team environment

- Team meeting participation techniques;
- Participation in ‘buddy-training’

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REQUIRED SKILLS AND KNOWLEDGE

T6 Principles of sustainable energy practice

- Performance indicators
- Using enterprise-based systems to recommend and implement workplace improvements

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of the competency standard unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence

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need to be 'rich' in nature to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each Element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the Essential Knowledge and Associated Skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Occupational, health and safety legislation; Statutory

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legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
- Australian and/or international standards related to quality systems
- The application of quality systems
- Identifying procedural change requirements
- Dealing with an unplanned event by drawing on Essential Knowledge and Skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this competency standard unit

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working in confined spaces with different types of plant and equipment as well as different structural/construction types and method and in a variety of environments.

Method of assessment

9.4)

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is

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expected in the Industry to which this competency standard unit applies. This requires that the specified Essential Knowledge and Associated Skills be assessed in a structured environment that is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the Essential Knowledge and Skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Quality assurance systems and procedures may includes document management systems, workplace policies and procedure, AS/NZS ISO 9001 compliance, sustainable energy principles and includes those factors defined in the glossary under ‘environment’

Work may be affected by Australian standards, Occupational Health and Safety standards, codes of practice, manufacturer’s specifications, environmental requirements and enterprise procedures

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. Section 2.1 Preliminary Information and Glossaries contains a glossary of defined terms.

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Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations

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UEPOPS203B Operate and monitor communications system

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to operate and monitor the application of communications systems.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

Pre-Requisites

Prerequisite Unit(s) **4)**

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Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 2 Writing 2 Numeracy 2

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Select and use equipment	1.1	The appropriate medium for communication is determined from analysis of available options, previous communication or current circumstances and used in accordance with enterprise guidelines, manufacturer's and/or site requirements
	1.2	Communication procedures for opening, passing and receiving messages are conducted to enterprise/site requirements
	1.3	Communication equipment is used in accordance with manufacturer's and enterprise/site procedures
	1.4	Limitations of communication links are identified and alternatives considered
	1.5	Communication is conveyed logically, concisely and articulately in a manner appropriate to the situation to satisfy job requirements
	1.6	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2 Monitor communication system	2.1	Data acquisition is monitored and assessed for quality and action taken in accordance with enterprise/site procedures
	2.2	Effectiveness of communication, including understanding of the intent and content, is confirmed between the parties in accordance with site requirements
	2.3	The need for communication assistance is identified and addressed in accordance with job requirements
3 Complete documentation	3.1	Documentation is updated, logs maintained and equipment problems, abnormalities and status are reported and logged in accordance with enterprise/site procedures

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence must show that knowledge has been acquired of safe working practices and communication systems.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

KS01-PO203B Communication Systems

Evidence shall show an understanding of communication systems to an extent indicated by the following aspects:

T1 Use of a range of electronic communication tools including:

- facsimile;
- telephone (POTS and mobile);
- two-way radio or CB radio;
- SMS messaging;
- personal computers;
- e-mail;
- Internet/Intranet messaging;
- pager; and
- intercom

according to licensing regulations, enterprise requirements and manufacturers' instructions.

T2 Use of a range of non-electronic communication tools, including:

- spoken communication; and
- hand signals.

T3 Communication protocols and procedures required when using the following mediums:

- facsimile;
- telephone (POTS and mobile)
  - answering procedures
  - limitations of mobile phones including black/dead spots;
- two-way radio or CB radio
  - call signs
  - calling in and signing off
  - Privacy and security

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REQUIRED SKILLS AND KNOWLEDGE

- using common channels and repeaters
- limitations including black/dead spots;
- SMS messaging;
- E-mail
  - etiquette;
- Internet/Intranet messaging
  - privacy and security;
- pager;
- intercom;
- report forms;
- log books;

T4 Interpersonal communication

- communicating facts clearly;
- communicating technical concepts to non-technical people;
- active listening skills;
- dealing with difficult, angry or irate people;
- on-the-job training techniques.

T5 Enterprise Recording Procedures

- Reports;
- Logs;
- Databases;
- Escalation procedures

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of the competency standard unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

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Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each Element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with

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the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- Each Element on at least two occasions
- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the Essential Knowledge and Associated Skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Knowledge and application of relevant sections of: Occupational, health and safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Acknowledging and prioritising fault communication
  - Selecting and applying communication systems
  - Monitoring communication systems
  - Dealing with an unplanned event by drawing on Essential Knowledge and Skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions
- Suitable work environment, facilities, equipment and materials

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to undertake actual work as prescribed by this competency standard unit

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working in confined spaces, with different types of plant and equipment as well as different structural/construction types and method and in a variety of environments

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this competency standard unit applies. This requires that the specified Essential Knowledge and Associated Skills be assessed in a structured environment, which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the Essential Knowledge and Skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

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Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Medium for communications may include facsimile, telephone, radio, other electronic medium, memo, letter, report form, log book, switchboard, e-mail, pager, intercom, CB, poster, personal contact, signal and body language

Information and documentation sources may include verbal or written communications; enterprise safety rules documentation; enterprise operating instructions; dedicated computer equipment; enterprise/site standing and operating instructions; enterprise log books; manufacturer's operation and maintenance manuals; and equipment and alarm manuals

Communication procedures may include protocol, appropriate forms/log books, telephone answering procedure and radio procedure

Limitations may be radio/mobile phone dead spots, weather conditions, customer language barriers, customers lack of technical knowledge and incoherent or irate callers

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Access skills and knowledge for employment

This unit is not suitable for work entry and is intended for building upon competencies previously acquired.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations

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UEPOPS204B Maintain and utilise records

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to maintain and use of recorded data.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

Pre-Requisites

Prerequisite Unit(s) **4)**

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Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 2 Writing 2 Numeracy 2

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT		PERFORMANCE CRITERIA	
1	Maintain records	1.1	The appropriate recording tool is selected in accordance with job requirements
		1.2	Information is recorded and/or updated, using appropriate techniques, in accordance with work requirements
		1.3	Recording requirements are identified and assessed in accordance with work requirements
		1.4	Records are created in accordance with work requirements
		1.5	Records are stored in an appropriate manner in accordance with work requirements
		1.6	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2	Retrieve records	2.1	Records are retrieved and interrogated in accordance with work requirements
		2.2	Source of information/records is selected in accordance with work requirements
		2.3	Required information/records are selected in accordance with work requirements

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence must show that knowledge has been acquired of safe working practices and Record keeping.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

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REQUIRED SKILLS AND KNOWLEDGE

KS01-PO204B Record Keeping

Evidence shall show an understanding of record keeping systems to an extent indicated by the following aspects:

T1 Use of a range of electronic record keeping tools including:

- Personal computer applications
  - Word processors
  - Spreadsheets
  - Databases
- Data loggers
- Chart recorders
- SCADA systems
- Data Acquisition and Surveillance (DAS) systems

T2 Use of a range of non-electronic record keeping tools including:

- Memorandums and letters
- Log sheets
- Outage reports
- Whiteboards

T3 Use of enterprise-based document and record management systems, both paper-based and electronic, including:

- Creation and storing of new documents and records
- Archiving of documents and records according to legislative and enterprise requirements
- Electronic data back-up according to enterprise requirements

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of the competency standard unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of 9.1)

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Assessment

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each Element and associated Performance Criteria

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shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the Essential Knowledge and Associated Skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Knowledge and application of relevant sections of: Occupational, health and safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Acquiring and analysing information relevant for recording
  - Maintaining records
  - Retrieving records
  - Dealing with an unplanned event by drawing on Essential Knowledge and Skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions
- Suitable work environment, facilities, equipment and materials

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to undertake actual work as prescribed by this competency standard unit

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working in confined spaces, with different types of plant and equipment as well as different structural/construction types and method and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this competency standard unit applies. This requires that the specified Essential Knowledge and Associated Skills be assessed in a structured environment, which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the Essential Knowledge and Skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

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Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Recording tools may include memos, log sheets, document management systems, based recording systems, graphs, PC, outage reports, operations whiteboard, SCADA trending, printer, system diagrams, diaries, chart recorders, data loggers and D.A.S.

Safety standards may include relevant sections of Occupational Health and Safety legislation, enterprise safety rules, relevant state and federal legislation and national standards for plant

Records may include operating events, regular data acquisition, memos, explanations, recommendations, system diagrams, verbal reports, visual comparison and statistics

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations

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UEPOPS205B Conduct minor mechanical maintenance

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to conduct a range of minor/basic maintenance functions associated with, but not limited to, mechanical equipment.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

Pre-Requisites

Prerequisite Unit(s) **4)**

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Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 2 Writing 2 Numeracy 2

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and prepare for the work	1.1 Work requirements are identified from request/work orders or equivalent and clarified/confirmed with appropriate parties or by site inspection
	1.2 Occupational Health and Safety standards, statutory requirements, relevant Australian standards, codes of practice, manufacturers' specifications, environmental requirements and enterprise procedures are identified, applied and monitored throughout the work procedure
	1.3 Resources required to satisfy the work plan are identified, obtained and inspected for compliance with the job specifications
	1.4 Relevant plans, drawings and texts are selected and interpreted in accordance with the work plan
	1.5 Correct size, type and quantity of materials/components are determined, obtained and inspected for compliance with the job specifications
	1.6 Work is planned in detail including sequencing and prioritising and considerations made, where appropriate, for the maintenance of plant security and capacity in accordance with system/site requirements
	1.7 Co-ordination requirements, including requests for isolations where appropriate, are resolved with others involved, affected or required by the work
	1.8 Potential hazards are identified and prevention and/or control measures are selected in accordance with the work plan and site procedures
	1.9 Work area is prepared in accordance with work requirements and site procedures
2 Conduct minor	2.1 Required isolations are confirmed where

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ELEMENT	PERFORMANCE CRITERIA	
maintenance		appropriate in accordance with enterprise requirements
	2.2	Minor maintenance is conducted in accordance with the work plan and site requirements
	2.3	Minor adjustments are undertaken in accordance with prescribed procedures and schedules and site requirements
	2.4	Faults are reported to the relevant parties in accordance with site/enterprise procedures
3 Complete the work	3.1	Work is completed and appropriate personnel notified in accordance with site/enterprise requirements
	3.2	Work area is cleared of waste, cleaned, restored and secured in accordance with site/enterprise procedures
	3.3	Plant, tools and equipment are maintained and stored in accordance with site/enterprise procedures
	3.4	Work completion details are finalised in accordance with site/enterprise procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence must show that knowledge has been acquired of safe working practices and minor mechanical maintenance.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

KS01-PO205B Mechanical Maintenance - Minor

Evidence shall show an understanding of how to undertake minor mechanical maintenance to an extent indicated by the following aspects:

T1 Use of a range of hand tools, including:

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REQUIRED SKILLS AND KNOWLEDGE

- Basic measuring tools, including rulers
- Screwdrivers

i. Flat blade

ii. Phillips head

iii. Posidrive

iv. Torx™

- Metal hacksaw
- Hammers

i. Ball pein

ii. Claw hammer

iii. Club hammers

iv. Soft-faced hammers or mallets

- Spanners and sockets

i. Open-ended spanners

ii. Ring spanners

iii. Adjustable spanners

- Pliers

i. Combination pliers

ii. Long nose pliers

iii. Multi-grip

iv. Vice grips

- Wrenches

i. Stillson

ii. Footprint

- Allen keys
- Scrapers.

T2 Use of a range of small power tools, including:

- Pistol drills
- Battery drills and screwdrivers
- Angle grinders and polishers (buffers)
- Sanders

T3 Use a range of engineering workshop tools, including:

- Benders
- Guillotines

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REQUIRED SKILLS AND KNOWLEDGE

T4 Identification of a range of different types of metals, including:

- Mild Steel
- Sheet steel
- Aluminium
- Sheet aluminium
- Copper
- Brass

T5 Drill a range of materials using the correct drill bit type, including:

- Mild Steel
- Aluminium
- Copper

T6 Prepare surfaces on engineering materials for maintenance through:

- Sanding
- Grinding
- Polishing

T7 Clean machinery using techniques including:

- Water
- Pressure washers
- Steam cleaners
- Hydrocarbon solvents

T8 Air receivers and air lines

- Blow down air receivers
- Maintain oil levels in oilers
- Empty and wipe out dryers

T9 Health, Safety and Environment practices and procedures, including:

- Risk assessment
- Control of hazards
- Identification and correct use of personal protective equipment
- Manual handling techniques
- Compliance with ‘Permit-to-Work’ requirements and equipment isolation procedures
- Dealing with waste in an environmentally appropriate manner
- Housekeeping

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Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of the competency standard unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

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Critical aspects of evidence required to demonstrate competency in this unit **9.2)**

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each Element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the Essential Knowledge and Associated Skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti-Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Knowledge and application of relevant sections of: Occupational, health and safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Acquiring and analysing information relevant for recording
  - Maintaining records
  - Retrieving records
  - Dealing with an unplanned event by drawing on Essential Knowledge and Skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

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Context of and specific resources for assessment **9.3)**

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this competency standard unit

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working in confined spaces, with different types of plant and equipment as well as different structural/construction types and method and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this competency standard unit applies. This requires that the specified Essential Knowledge and Associated Skills be assessed in a structured environment, which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the Essential Knowledge and Skills described in this unit.

Concurrent **9.5)**

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assessment and relationship with other units

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Minor maintenance may include lubrication, , gland nipping, draining of water taps, filter cleaning and changing, charging bowl and ball mills, exchange of conveyor rollers, removing/replacing access covers, replacing shear pins, applying plastic metals, degreasing, preparing surfaces, limited mechanical assembly and minor fabrication tasks e.g. brackets, gaskets.

Inspections should be planned with the appropriate parties to determine access, conditions and work requirements.

Materials may refer to lubricants, cleaning agents and emery paper.

Equipment may include pumps, fans, compressors, blowers, transmissions, a.c./d.c. rotating electrical plant, pipe work, heat exchangers, tanks, dampers, mills, feeders, crushers, conveyors and air slides.

Tools may include drills, angel grinders, buffers, sanders, grease guns, benders, guillotines, pressers, scrapers and hand tools.

Appropriate parties may refer to supervisor, tradesperson or operations personnel.

Work completion details and plans may include plant and maintenance records, job cards, check sheets, on device labelling updates and reporting and/or documenting equipment defects.

Work site environment may be affected by nearby plant or processes, e.g. chemical, heat, dust, noise, gas and oil.

Isolations can refer to electrical/mechanical or other associated processes.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

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Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations

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UEPOPS206B Conduct minor electrical maintenance

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to conduct a range of minor/basic maintenance functions associated with electrical equipment.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

Pre-Requisites

Prerequisite Unit(s) **4)**

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Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 2 Writing 2 Numeracy 2

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Plan and prepare for the work	1.1	Work requirements are identified from request/work orders or equivalent and clarified/confirmed with appropriate parties or by site inspection
	1.2	Occupational Health and Safety standards, statutory requirements, relevant Australian standards, codes of practice, manufacturers' specifications, environmental requirements and enterprise procedures are identified, applied and monitored throughout the work procedure
	1.3	Resources required to satisfy the work plan are identified, obtained and inspected for compliance with the job specifications
	1.4	Relevant plans, drawings and texts are selected and interpreted in accordance with the work plan
	1.5	Correct size, type and quantity of materials/components are determined, obtained and inspected for compliance with the job specifications
	1.6	Work is planned in detail including sequencing and prioritising and considerations made, where appropriate, for the maintenance of plant security and capacity in accordance with system/site requirements
	1.7	Co-ordination requirements, including requests for isolations where appropriate, are resolved with others involved, affected or required by the work
	1.8	Potential hazards are identified and prevention and/or control measures are selected in accordance with the work plan and site procedures
	1.9	Work area is prepared in accordance with work requirements and site procedures
	1.10	Where appropriate, the teams and individuals

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ELEMENT		PERFORMANCE CRITERIA	
			roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2	Conduct minor maintenance	2.1	Required isolations are confirmed where appropriate in accordance with enterprise requirements
		2.2	Minor maintenance is conducted in accordance with the work plan and site requirements
		2.3	Minor adjustments are undertaken in accordance with prescribed procedures and schedules and site requirements
		2.4	Faults are reported to the relevant parties in accordance with site/enterprise procedures
3	Complete the work	3.1	Work is completed and appropriate personnel notified in accordance with site/enterprise requirements
		3.2	Work area is cleared of waste, cleaned, restored and secured in accordance with site/enterprise procedures
		3.3	Plant, tools and equipment are maintained and stored in accordance with site/enterprise procedures
		3.4	Work completion details are finalised in accordance with site/enterprise procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence must show that knowledge has been acquired of safe working practices and minor electrical maintenance.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

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REQUIRED SKILLS AND KNOWLEDGE

KS01-PO206B Electrical Maintenance - Minor

Evidence shall show an understanding of how to undertake minor electrical maintenance in an electrical generation plant context, to an extent indicated by the following aspects:

T1 Use of a range of electrical measuring tools, including:

- Multimeters
- Continuity tester

T2 Use of enterprise-based inspection checklists, including the following tasks:

- Identification and replacement of faulty lighting

i. CFLs

ii. Fluorescent tubes

iii. Fluorescent tube starters

iv. Emergency lighting

- Identification and replacement of faulty switchboard and control panel indicator lamps
- Status checks of fault indicators and tell-tales on plant equipment

i. Explosion vents

ii. Humidryer canisters

T3 Oil levels of electrical generation plant equipment, including:

- Alternators
- Turbines
- Transformers

i. Bushings

- Circuit breakers
- Oil conservators

T4 Air and oil filter maintenance, including cleaning and changing where required, on equipment including:

- Air conditioners
- Air compressors
- Fire fighting equipment

T5 Maintenance of event recording equipment, including:

i. Cleaning

ii. Checking serviceability

iii. Replacing consumables

- Types of event recorders includes:

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REQUIRED SKILLS AND KNOWLEDGE

i. Printers

ii. Plotters

iii. Chart recorders

iv. Event loggers

T6 Health, Safety and Environment practices and procedures, including:

- Risk assessment
- Control of hazards
- Identification and correct use of personal protective equipment
- Compliance with ‘Permit-to-Work’ requirements and equipment isolation procedures
- Dealing with waste in an environmentally appropriate manner
- Housekeeping

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of the competency standard unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry’s preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord

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with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each Element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as

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specified in the Performance Criteria and Range Statement
    - Demonstrate an understanding of the Essential Knowledge and Associated Skills as described in 6) Essential Knowledge and Associated Skills of this unit
    - Demonstrate an appropriate level of employability skills
    - Conduct work observing the relevant Anti-Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
    - Knowledge and application of relevant sections of: Occupational, health and safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
    - Preparation and planning of work
    - Maintenance techniques and procedures
    - Completion of work procedures
    - Dealing with an unplanned event by drawing on Essential Knowledge and Skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this competency standard unit

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working in confined spaces, with different types of plant and equipment as well as different structural/construction types and method and in a variety of

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environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note: Competent performance with inherent safe working practices is expected in the Industry to which this competency standard unit applies. This requires that the specified Essential Knowledge and Associated Skills be assessed in a structured environment, which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the Essential Knowledge and Skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Minor maintenance may include changing globes and starters, switchboard indicator lenses, checking transformer oil levels, flag/tell-tale patrols, changing of oil and air filters and humi-dryers, cleaning of air and oil filters, battery inspection, recording of cell voltages and specific gravity; cleaning, minor fabrication tasks, e.g. brackets, cable supports, gaskets and similar.

Inspections should be planned with the appropriate parties to determine access,

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RANGE STATEMENT

conditions and work requirements.

Materials may include lubricants, cleaning agents, contact cleaners, emery paper and deodorisers.

Consumables may include but not be limited to, air filter media, filters, charts, pens, ribbons, paper and lubricants.

Equipment may include printers, plotters, recorders, battery cells, air conditioners, cooling plant, transformers, switchboards and control panels.

Tools may include general hand tools, portable electrical tools, measuring tools and specialist tools.

Appropriate parties may refer to supervisor, tradesperson or operations personnel.

Work completion details may include plant and maintenance records, job cards, check sheets, on device labelling updates, reporting and/or documenting equipment defects.

Work site environment may be affected by nearby plant or processes, e.g. chemical, heat, dust, noise, gas and oil.

Isolations can refer to electrical/mechanical or other associated processes.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations

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UEPOPS207B Perform plant lubrication

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to maintain grease, oil levels and quality in all areas of plant.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

Pre-Requisites

Prerequisite Unit(s) **4)**

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Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 2 Writing 2 Numeracy 2

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT		PERFORMANCE CRITERIA	
1	Plan and prepare	1.1	Safety issues are identified to comply with enterprise/site requirements
		1.2	Work requirements are identified from relevant personnel and documentation
		1.3	Documentation to determine plant status is assessed and evaluated
		1.4	Isolation of plant is arranged where applicable in accordance with enterprise/site procedures
		1.5	Tools and lubricants are acquired as required in accordance with enterprise/site procedures
		1.6	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2	Perform routine checks	2.1	Plant is checked in accordance with enterprise/site procedures
		2.2	Abnormal lubricating and plant conditions are identified. Appropriate personnel are informed of abnormal conditions
3	Lubricate plant	3.1	Plant to be lubricated is cleaned before work is carried out
		3.2	Plant is lubricated in accordance with manufacturers and enterprise/site procedures
		3.3	Plant is left in a condition that ensures safety to personnel and plant integrity
4	Complete documentation	4.1	Documentation is updated and plant problems, movements, abnormalities and status are reported and logged in accordance with enterprise/site procedures

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence must show that knowledge has been acquired of safe working practices and lubrication of generation plant equipment.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

KS01-PO207B Lubrication of Generation Plant Equipment

Evidence shall show an understanding of how to undertake lubrication of plant equipment found in an electricity generation context to an extent indicated by the following aspects:

T1 Function, types and purposes of lubricants, including:

- Oils
- Greases
- Synthetic lubricants

T2 Lubrication of machinery, including

- Application of lubricants via –

i. grease guns

ii. oilers

iii. automatic systems

iv. bearing grease points

v. bearing oil reservoirs

vi. oil tanks

- Problems resulting from excessive or inadequate lubricants

T3 Lubricant testing and analysis, including:

- Sources of lubricant contamination
- Sampling techniques
- Testing techniques

T4 Health, Safety and Environment practices and procedures, including:

- Risk assessment
- Control of hazards
- Identification and correct use of personal protective equipment
- Compliance with ‘Permit-to-Work’ requirements and equipment isolation procedures.
- Material handling procedures

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REQUIRED SKILLS AND KNOWLEDGE

i. Use of Material Safety Data Sheets (MSDSs)

- Dealing with waste in an environmentally appropriate manner
- Housekeeping

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of the competency standard unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature to minimise error in judgment.

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Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each Element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the Essential Knowledge and Associated Skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti-Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Knowledge and application of relevant sections of: Occupational, health and safety legislation; Statutory

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legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
- The preparation and planning of work
- Knowledge of the types of lubricants and their application
- Lubricating procedures
- Dealing with an unplanned event by drawing on Essential Knowledge and Skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this competency standard unit

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working in confined spaces, with different types of plant and equipment as well as different structural/construction types and method and in a variety of environments

Method of assessment

9.4)

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this competency standard unit

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applies. This requires that the specified Essential Knowledge and Associated Skills be assessed in a structured environment, which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the Essential Knowledge and Skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Systems, plant and/or equipment may include automatic lubrication systems, oil tanks, bearing grease points and bearing oil reservoir

Safety standards may include relevant sections of Occupational Health and Safety legislation, enterprise safety rules, relevant state and federal legislation and national standards for plant.

Information and documentation sources may include verbal and written communications, enterprise/site safety rules documentation/form(s), equipment and alarm manuals, dedicated computer equipment, enterprise/site standing and operating instructions, enterprise/site logbook and manufacturer’s operation and maintenance manuals.

Technical and operational indicators may include stimuli (audio, smell, touch, visual), local indicators and recorders and alarms (visible and or audible).

Communications may be by means of telephone, two way radio, pager, public address system, facsimile, computer (electronic mail) and operating log (written or verbal).

Appropriate personnel to consult, give or receive direction may include supervisor/team leader or equivalent, technical and engineering officers or equivalent,

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RANGE STATEMENT

contractor staff, maintenance staff and power plant operations personnel.

Operating environment may be, during inclement or otherwise harsh weather conditions, in wet/noisy/dusty/hot areas or during night periods.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries .

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations

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UEPOPS209B Perform process plant inspections

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to conduct the inspection of generation production plant and associated equipment.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

Pre-Requisites

Prerequisite Unit(s) **4)**

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Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 2 Writing 2 Numeracy 2

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT		PERFORMANCE CRITERIA	
1	Prepare for inspection	1.1	Relevant maintenance and operating history is obtained in accordance with work requirements
		1.2	Needs and outcomes for plant inspections are defined in accordance with work requirements
		1.3	Appropriate method sheets/check sheets are obtained in accordance with work requirements
		1.4	Availability and access to plant is determined in accordance with work requirements
		1.5	Preparations for inspection are undertaken in accordance with enterprise/site procedures
		1.6	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2	Inspect process plant	2.1	Process plant is inspected in accordance with relevant sections of enterprise, state, or national standards
		2.2	Process plant is identified and operational status determined in accordance with enterprise/site procedures
		2.3	Inspection is conducted using appropriate methods in accordance with enterprise/site procedures
		2.4	Needs and outcomes for the inspection are achieved in accordance with work requirements
3		3.1	Relevant records and documentation are updated in accordance with job requirements and enterprise/site procedures

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence must show that knowledge has been acquired of safe working practices and basic generation plant inspections.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

KS01-PO209B Electrical Generation Plant Inspections - basic

Evidence shall show an understanding of how to inspect electrical generation plant equipment to an extent indicated by the following aspects:

T1 Accessing historical records

T2 Instruction sheets, including:

- Enterprise, state or national standards
- Enterprise-specific work instructions or job sheets
- Manufacturers' operating instructions and manuals
- Plant drawings
- Equipment checklists

T3 Perform inspection of plant equipment associated with electricity generating plants by use of sight, sound and smell.

- Types of equipment includes:

i. pipe work

ii. valves and fittings

iii. pumps

iv. photovoltaic panels

v. solar collectors

vi. wind turbines

vii. chemical and water treatment processes

viii. instrumentation and process control

ix. civil, electrical, thermal and mechanical works

x. DC supplies

xi. security equipment

xii. fire prevention and fire management equipment

xiii. data recorders

xiv. compressed air systems

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REQUIRED SKILLS AND KNOWLEDGE

xv. environmental containment systems

xvi. general purpose lighting

xvii. communication systems

- telephones
- public address systems
- emergency warning systems and alarms

- Checks include:

i. general condition

ii. corrosion

iii. correct positioning and settings

iv. leaks

- water
- steam
- oil
- air

v. noise and vibration

vi. odours

vii. housekeeping

viii. availability and condition of personal protective equipment (PPE)

ix. availability of spares

x. availability of procedure manuals (including emergency procedures)

T4 Health, Safety and Environment practices and procedures, including:

- Risk assessment
- Control of hazards
- Identification and correct use of personal protective equipment
- Compliance with ‘Permit-to-Work’ requirements and equipment isolation procedures
- Emergency procedures
- Operation of plant equipment according to Legislative requirements, Regulations and Codes of Practice applicable to the industry.

Evidence Guide

EVIDENCE GUIDE

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EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of the competency standard unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

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Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each Element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the Essential Knowledge and Associated Skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti-Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Knowledge and application of relevant sections of: Occupational, health and safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - The process plant and its operating parameters
  - Inspection procedures and techniques
  - Identifying worn, damaged or faulty plant and equipment
  - Dealing with an unplanned event by drawing on Essential Knowledge and Skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

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Context of and specific resources for assessment **9.3)**

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this competency standard unit

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working in confined spaces, with different types of plant and equipment as well as different structural/construction types and method and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this competency standard unit applies. This requires that the specified Essential Knowledge and Associated Skills be assessed in a structured environment, which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the Essential Knowledge and Skills described in this unit.

Concurrent assessment and relationship with **9.5)**

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other units

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Generation plant and/or equipment may include fired and unfired pressure vessels; pipe work; valves and fittings; turbines and generators; chemical and water treatment processes; instrumentation and process control; and civil, electrical, thermal and mechanical works.

Relevant standards may include sections of Occupational Health and Safety legislation, enterprise safety rules and procedures, relevant state and federal legislation, national standards or codes of practices for plant.

Information and documentation sources may include verbal or written communications; enterprise safety rules documentation; equipment and alarm manuals; dedicated computer equipment; drawings, logic diagrams; plant records; enterprise/site log books; and manufacturer’s operation and maintenance manuals.

Technical and operational indicators may include stimuli (audio, smell, touch, visual): remote or local indicators, recorders, and alarms (visible and/or audible).

Inspection results may be conveyed to supervisor/team leader or equivalent; technical and engineering officers or equivalent; power system control personnel or equivalent; maintenance staff, power plant operations personnel; contractor and external specialist personnel.

Inspection environment may be remote from plant; aided by indicators and monitors; during inclement or otherwise harsh weather conditions; in wet/noisy/dusty areas; during night periods and in confined spaces.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

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Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations

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UEPOPS210B Conduct first response within a workplace team

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to conduct a first response within emergency team operations.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety.

Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

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Prerequisite Unit(s) **4)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 2 Writing 2 Numeracy 2

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Identify emergency team roles and responsibilities	1.1 The purpose of the team is identified and, where necessary, clarified with relevant personnel
	1.2 The duties and responsibilities of team members are identified
	1.3 Instructions from supervising team members are carried out in accordance with enterprise/site procedures
	1.4 Team members are supported in relation to duties and responsibilities
	1.5 Appropriate team member identification is displayed in accordance with procedures
2 Cooperate with other emergency service(s) personnel	2.1 The roles and responsibilities of emergency service(s) personnel are clarified, where necessary
	2.2 Role and authority of emergency services is conveyed to other team members
	2.3 Instructions from relevant emergency services personnel are clarified and complied with
3 Evaluate the emergency	3.1 The emergency situation is identified and classified and appropriate action determined
	3.2 Advice is accessed from relevant personnel in evaluating the emergency
	3.3 Advice is accessed from relevant personnel in evaluating the emergency
	3.4 Emergency evacuation procedures are followed where appropriate
	3.5 Requirement for special expert assistance is identified
	3.6 Incident is evaluated to prevent repetition of risk
	3.7 Location of emergency is identified and most effective route to emergency is determined

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ELEMENT	PERFORMANCE CRITERIA	
	3.8	Situations where first attack actions are not safe are reported according to enterprise/site procedures
4 Contain emergencies	4.1	Emergencies are contained to their area of origin were possible, in accordance with procedures
	4.2	Emergency control equipment or facilities used to confine emergency are used in a safe manner, and with regard to other team members and personnel
	4.3	Emergency control equipment or facilities are used within limitations and relevant operating procedures
	4.4	Manufacturer's specifications, environmental requirements and enterprise procedures are identified, applied and monitored throughout the work procedures
	4.5	The anticipated behaviour and characteristics of the fire or emergency incident are taken into account in the directions and advice given to team members after appropriate site inspection
	4.6	A plan to ensure personnel safety and plant integrity is developed, in accordance with statutory, industry and site standards
	4.7	Relevant documentation is obtained in accordance with procedures
	4.8	Materials, equipment and resources required to satisfy the job are identified and obtained
	4.9	Effective lines of communication are established if required
5 Use emergency equipment	5.1	Appropriate equipment is selected to attack emergency situation
	5.2	Equipment is checked in accordance with procedures or standards to ensure it is safe and ready for use
	5.3	Equipment is used in accordance with relevant

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ELEMENT	PERFORMANCE CRITERIA	
		procedures and standards
	5.4	Operation and location of others in the team are monitored to ensure the continuing communication, visual contact and safety in accordance with enterprise/site procedures
	5.5	Use of equipment is co-ordinated in conjunction with other emergency actions/responses
	5.6	Rescue and first aid procedures are applied as required and in accordance with procedures
6 Report outcomes of emergency response	6.1	Fire and emergency equipment is marked or positioned after use, in accordance with procedures, to indicate it requires servicing or replacing
	6.2	The use of emergency equipment is reported according to procedures
	6.3	De-briefing is attended and responded to in accordance with procedures
	6.4	Effectiveness of emergency response is evaluated and recommendations are submitted for consideration

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of conducting first responses within a workplace team.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO210B first response within a workplace team

Evidence shall show that knowledge has been acquired for safe working practices of

T1 Relevant Environmental, Occupational Health and Safety legislation and

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REQUIRED SKILLS AND KNOWLEDGE

regulations

T2 Enterprise procedures

T3 Plant drawings and manufacturers manuals

T4 Introduction to and typical arrangements of power production plant

T5 Relevant plant and equipment, its location and operating parameters

T6 Relevant state and territory regulations

T7 Relevant enterprise/site safety procedures

T8 Site communications systems

T9 First aid

T10 Appropriate warning signs

T11 Equipment appropriate for the task

T12 Operation of emergency stations

T13 Roles of the emergency team and its members

T14 Classifications of fires and emergencies

T15 Roles and responsibilities of emergency services

T16 Fire fighting and rescue principles and techniques

T17 Human resources and management principles within a team

T18 Material safety data sheets and emergency service

KS02-PO210B first response within a workplace team

Specific skills needed to achieve the Performance Criteria:

T1 Interpret plant drawings and manufacturers manuals

T2 Apply relevant state and territory regulations

T3 Apply relevant enterprise/site safety procedures

T4 Apply enterprise/site emergency procedures and techniques

T5 Communicate effectively

T6 Plan and prioritise work

T7 Work in a team

T8 Apply first aid and resuscitation techniques

T9 Apply emergency and evacuation procedures

T10 Identify and operate appropriate emergency communications equipment

T11 Apply emergency techniques and procedures

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Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of the competency standard unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

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Critical aspects of evidence required to demonstrate competency in this unit **9.2)**

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each Element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the Essential Knowledge and Associated Skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti-Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Knowledge and application of relevant sections of: Occupational, health and safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Ability to communicate effectively with the appropriate personnel and agencies during an emergency
  - Knowledge and ability to apply first aid and resuscitation techniques
  - Knowledge of potential hazards during initial response
  - Knowledge and application of fire fighting and rescue principles and techniques

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- Ability to respond to an emergency situation
- Ability to use emergency equipment
- Dealing with an unplanned event by drawing on Essential Knowledge and Skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this competency standard unit

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working in confined spaces, with different types of plant and equipment as well as different structural/construction types and method and in a variety of environments.

Method of assessment

9.4)

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this competency standard unit applies. This requires that the specified Essential Knowledge and Associated Skills be assessed in a structured environment, which is primarily intended for learning/assessment and incorporates all

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necessary equipment and facilities for learners to develop and demonstrate the Essential Knowledge and Skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Incidents may include fire, rescue, hazardous substances, explosions, bomb alerts, terrorists, radiation, natural disasters, environmental, electrical storms/incidents, accidents, electrical equipment, structural, security related or wildlife related incidents.

Special assistance may be on site personnel (e.g. chemists, fire team), rescue team, environmental officer, safety officer, radiation officer, floor warden or equivalent, chief warden or equivalent and security staff.

External emergency groups may include police, fire fighting agencies, ambulance, state emergency service and supply authorities (such as water utility).

Communications may be by means of verbal, telephone system, two-way radio, pager, emergency public address system, radio, facsimile, computer (electronic mail) or enterprise/site logbook.

Additional resources may include personnel, fire fighting equipment, fire fighting protective clothing, vehicles for transport of materials or personnel, communication equipment and ladders.

Site hazards may include power lines, trees, overhead service lines, abnormal weather conditions, dangerous materials/chemicals, earthworks/obstructions, underground services, hazardous substances and electrical, thermal, gas, explosive or structural hazards.

Information and documentation sources may include verbal and written

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RANGE STATEMENT

communications; enterprise/site operating instructions; manufacturer's operating and maintenance manuals; dedicated computer equipment; enterprise/site log books; critiques - meetings, discussion, demonstrations and explanations; feedback - comments on suitability of procedures and effectiveness of control equipment; materials safety data sheets; drawings; and maps.

Personnel refers to all personnel and may include supervisory, maintenance, operational, contractors and administrative personnel, visitors and shift operatives.

Operating environment may be during inclement or otherwise harsh weather conditions, in wet/noisy/dusty/hot areas or during night periods.

Identification may include helmets, armbands, vests and other apparel.

Technical and operational indicators may include stimuli (audio, smell, touch, visual), computers and alarms (visible and or audible).

Safety standards may include relevant sections of Occupational Health and Safety legislation, enterprise safety rules and national standards for plant.

Limitations may refer to equipment and competencies of team members.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations

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UEPOPS211B Clean plant and equipment

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to clean industrial plant, machinery and surrounds associated with Electricity Generation stations and related surroundings that may include the appropriate removal of excess or oil based soil.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 2 Writing 2 Numeracy 2

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the

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Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and prepare for the work	1.1 Work requirements are identified from request/work orders or equivalent and clarified/confirmed with appropriate parties or by site inspection
	1.2 Occupational Health and Safety standards, statutory requirements, relevant Australian Standards, Codes of Practice, manufacturers' specifications, environmental requirements and enterprise procedures are identified, applied and monitored throughout the work procedure
	1.3 Resources required to satisfy the work plan are identified, obtained and inspected for compliance with the job specifications
	1.4 Resources required to satisfy the work plan are identified, obtained and inspected for compliance with the job specifications
	1.5 Correct size, type and quantity of materials/components are determined, obtained and inspected for compliance with the job specifications
	1.6 Work is planned in detail including sequencing and prioritising and considerations made where appropriate for the maintenance of plant security and capacity in accordance with system/site requirements
	1.7 Co-ordination requirements, including requests for isolations where appropriate, are resolved with others involved, affected or required by the work
	1.8 Potential hazards are identified and prevention and/or control measures are selected in accordance with the work plan and site procedures

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ELEMENT	PERFORMANCE CRITERIA	
	1.9	Work area is prepared in accordance with work requirements and site procedures
	1.10	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of on-the-job training
2 Clean plant and equipment	2.1	Required isolations are confirmed, where appropriate, in accordance with site requirements
	2.2	Surfaces are pre-applied, where required, with suitable agent to assist in release of soil in accordance with manufacturer's instructions
	2.3	Cleaning equipment and accessories are operated in accordance with manufacturer's instructions and work requirements
	2.4	Plant and equipment is cleaned with due regard being paid to nearby plant security and capacity in accordance with the work plan
	2.5	Plant and equipment is cleaned in conjunction with others involved in, or affected by, the work in accordance with the work plan
	2.6	Residual waste is directed to suitable disposal points in accordance with relevant environmental procedures or legislation
	2.7	Final job inspection is carried out in accordance with the work plan
3 Complete the work	3.1	Work is completed and appropriate personnel notified in accordance with site/enterprise requirements
	3.2	Work area is cleared of waste, cleaned, restored and secured in accordance with site/enterprise procedures
	3.3	Plant, tools and equipment are maintained and stored in accordance with site/enterprise procedures
	3.4	Work completion details are finalised in

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ELEMENT	PERFORMANCE CRITERIA
	accordance with site/enterprise procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of cleaning plant and equipment.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO211B – Plant and Equipment

Evidence shall show that knowledge has been acquired for safe working practices of:

T1 Relevant Environmental, Occupational Health and Safety legislation and regulations

T2 Enterprise procedures

T3 Introduction to and typical arrangements of power production plant

T4 Relevant plant and equipment, its location parameters

T5 Cleaning agents, and their properties

T6 Protection of nearby plant or equipment from cleaning

T7 Cleaning equipment and their accessories

T8 Hazardous materials

T9 Cleaning techniques and procedures

T10 Hand and portable power tools

KS02-PO211B – Plant and Equipment

Specific skills needed to achieve the Performance Criteria:

T1 Interpret plant drawings and manufacturers manuals

T2 Identify and select appropriate cleaning methods

T3 Identify and operate appropriate cleaning equipment

T4 Protect nearby plant or equipment from cleaning

T5 Handle hazardous materials

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REQUIRED SKILLS AND KNOWLEDGE

T6 Apply cleaning techniques and procedures

T7 Use hand and portable power tools

T8 Communicate effectively.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of the competency standard unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature to minimise error in judgment.

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Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each Element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the Essential Knowledge and Associated Skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti-Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Knowledge and application of relevant sections of: Occupational, health and safety legislation; Statutory

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legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
- Applying cleaning techniques and procedures
- Identifying and operating appropriate cleaning equipment
- Identifying and selecting appropriate cleaning methods
- Dealing with an unplanned event by drawing on Essential Knowledge and Skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this competency standard unit

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working in confined spaces, with different structural/construction types and method and in a variety of environments.

Method of assessment

9.4)

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this competency standard unit applies. This requires that the specified Essential Knowledge and

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Associated Skills be assessed in a structured environment, which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the Essential Knowledge and Skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Inspection should be planned with the appropriate parties to determine access, conditions and work requirements.

Environmental requirements may refer to the provision of an area to be used for collection and disposal of soil residue or suitable drainage of residues.

Resources may include ladders, scaffolding, work platforms, personal protective equipment, barricades and signs.

Materials may include cleaning agents, strippers, polishes, degreasers, disinfectant and appropriate chemicals/solvents.

Cleaning equipment may include hoses, lances, steam cleaners, brooms, buckets, shovels and motor driven vacuum cleaners.

Machinery cleaning methods may include hosing down, wash and wipe, air clean, brush down and scrub and wipe.

Potential hazards may include rotating plant, electrical equipment, slippery surfaces, airborne particulates, confined spaces, fumes and substances.

Safety standards may include relevant sections of Occupational Health and Safety legislation, enterprise safety rules, relevant state and federal legislation, national

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RANGE STATEMENT

standards for plant and Australian standards.

Information and documentation sources may include verbal or written communications, enterprise safety rules documentation, enterprise operating instructions, manufacturer's operational and maintenance manuals, equipment and alarm manuals, dedicated computer equipment, standing enterprise instructions, work plans, plant notes and enterprise log books

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations

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UEPOPS232B Transport plant and equipment

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to transport plant and equipment.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit may require a licence to practise in the workplace in some States or Territories. There may also be additional assessment activities required by regulatory authorities for the issue of the licence to practise.

Practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
UEENEEE101A	Apply Occupational Health and Safety regulations, codes and practices in the workplace

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 2 Writing 2 Numeracy 2

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

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Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT		PERFORMANCE CRITERIA	
1	Plan and prepare for transport	1.1	Safety requirements are identified in order to comply with enterprise/site transporting procedures
		1.2	Transport requirements are confirmed in accordance with work scheduling
		1.3	Characteristics of the load are identified and considered to ensure that appropriate loading and unloading procedures are followed
2	Obtain necessary permits	2.1	Permit application forms are completed in accordance with requirements
		2.2	Load is assessed so as not to exceed safe working capacity of vehicle and in accordance with manufacturer's specifications and regulatory authorities requirements
3	Load/unload plant and/or equipment	3.1	Vehicle inspected and checked prior to loading
		3.2	If required, start up, park up, shut down procedures are carried out in accordance with manufacturer's and/or enterprise/site procedures
		3.3	Machine loaded and unloaded safely ensuring no injury to personnel or damage to property, equipment and load
		3.4	Calculations on dimensions (height and width) of load and transport are made for over-sized loads
		3.5	Lashings are stored in accordance with storage procedures

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ELEMENT		PERFORMANCE CRITERIA	
4	Secure load	4.1	Load is secured using appropriate securing equipment and lashed to anchorage points in accordance with securing systems and manufacturer's specifications
		4.2	Lashing equipment is secured to vehicle to ensure integrity during transport
5	Operate transport vehicle	5.1	Pre-operational checks are carried out on plant in accordance with manufacturer's recommendations and site requirements
		5.2	Attachments set at correct height/position, and machine driven in accordance with traffic regulations and manufacturer's instructions
		5.3	Start up, park up, shut down procedures are carried out in accordance with manufacturer's and/or enterprise/site procedures
		5.4	Hazards are identified and avoided on public roads and work site
		5.5	Traffic regulations are adhered to
6	Complete documentation	6.1	Post operational checks and minor maintenance is carried out on machine and/or accessories in accordance with manufacturer's recommendations and site requirements
		6.2	Documentation is updated and plant problems, movements, abnormalities and status are reported and logged in accordance with enterprise/site procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of transporting plant and equipment.

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REQUIRED SKILLS AND KNOWLEDGE

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01- PO232B – Transport plant and equipment

Evidence shall show that knowledge has been acquired for safe working practices of:

T1 Relevant Environmental, Occupational Health and Safety legislation and regulations

T2 Relevant plant and equipment, its location and operation

T3 Introduction to and typical arrangements of power production plant

T4 Relevant state and territory regulations

T5 Operational and maintenance procedures

T6 Equipment capabilities and limitations

T7 Road transport and traffic authorities permits

T8 Loading and off-loading procedures

T9 Vehicle recording systems

T10Warning and directional signals

T11 Pre-start, start up and shut down procedures

T12 Enterprise recording procedures

KS02- PO232B – Transport plant and equipment

Specific skills needed to achieve the Performance Criteria:

T1 Apply relevant state and territory regulations

T2 Plan and organise resources

T3 Prepare and operate transport vehicle

T4 Use hand tools

T5 Communicate effectively

T6 Transport loads

T7 Apply pre-start, start up and shut down procedures

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and

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EVIDENCE GUIDE

must be read in conjunction with the Performance Criteria and the Range Statement of the competency standard unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

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Critical aspects of evidence required to demonstrate competency in this unit **9.2)**

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each Element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the Essential Knowledge and Associated Skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti-Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Knowledge and applications of relevant sections of: Occupational Health and Safety; statutory legislation; enterprise/site safety procedures; enterprise/site emergency procedures
  - Pre-start, start up and shut down procedures
  - Operating and manoeuvring vehicles and attachments
  - Applying for and following road transport and traffic authority permits
  - Loading and off-loading procedures
  - Dealing with an unplanned event by drawing on Essential Knowledge and Skills to provide appropriate solutions incorporated in the holistic assessment with the above

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listed items.

Context of and specific resources for assessment **9.3)**

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this competency standard unit

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working in limited spaces, with different structural/construction types and method and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this competency standard unit applies. This requires that the specified Essential Knowledge and Associated Skills be assessed in a structured environment, which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the Essential Knowledge and Skills described in this unit.

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Concurrent assessment and relationship with other units	**9.5)**
	There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.
	Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Plant and equipment may include: backhoe; bobcat; bulldozer, clamshell; continuous bucket trencher; dragline; dump truck; excavator; forklift; front end loader; gradall; grader; material spreader; paver; pipelayer; profile planer; recycler; roller; scraper; skid steer loader; soil compactor; telescopic materials handler; tractor; water cart and related accessories/attachments.

Safety standards may include relevant sections of Occupational Health and Safety legislation, national standards for plant, enterprise safety rules and relevant state and federal legislation.

Hazards may include: power lines; trees; overhead service lines; surrounding buildings; other equipment; earthworks; obstructions; underground services; bridges; tunnels; facilities and dangerous materials.

Information and documentation sources may include verbal and written communications; enterprise safety rules documentation/form(s); equipment and alarm manuals; dedicated computer equipment; standing enterprise/site and operating instructions; enterprise/site log books and manufacturer’s operation and maintenance manuals.

Technical and operational indicators may include stimuli (audio, smell, touch, visual), local indicators, recorders and alarms (visible and or audible).

Communications mediums may include telephone, two way radio, pager, public address system, facsimile, computer (electronic mail), operating logs, written, verbal, whistle or hand signal.

Tests may include performance, alarm and protection tests.

Appropriate personnel for consultation or giving or receiving direction may include

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RANGE STATEMENT

supervisor/team leader or equivalent, technical and engineering officers or equivalent, contractor staff, other production staff and maintenance staff.

Test fault finding and operating tools may include both power and hand tools.

Operating environment may be during inclement or otherwise harsh weather conditions, in wet/noise/dusty/hot areas or during night periods.

Faults and abnormal operating conditions may include loss of hydraulic oil pressure, loss of motor oil pressure, electrical breakdowns, loss of cooling water and loss of tyre pressure.

Minor maintenance may include fuel check, water checks, oil checks, greasing, cleaning, tyre or track inspections and minor adjustments.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations

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UEPOPS237B Perform tool store duties

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to cover the management and storage of tools and consumable items used in a workshop or similar environment associated within the Generation industry sector.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 2 Writing 2 Numeracy 2

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the

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Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and prepare for the work	1.1 Tooling requirements are identified from documentation and clarified/confirmed with trade and/or other appropriate parties.
	1.2 Occupational Health and Safety standards, statutory requirements, relevant Australian Standards, Codes of Practice, manufacturers' specifications, environmental requirements and enterprise procedures are identified, applied and monitored throughout the work procedures.
	1.3 Audit of tools and equipment is conducted and recorded to identify type, quantity and location in accordance with site/enterprise requirements.
	1.4 Appropriate tooling is identified from supplier catalogues and manuals and requirements are ordered in accordance with site/enterprise procedures.
2 Issue and maintain tools and associated equipment	2.1 Tooling orders received are checked for compliance and stored in accordance with site/enterprise procedures.
	2.2 Tools and associated equipment issued in accordance with site/enterprise procedures.
	2.3 Tools and associated equipment are inspected to ensure safe operation, defects noted and repairs instigated in accordance with site/enterprise procedures.
	2.4 Tools and associated equipment are maintained in accordance with site/enterprise requirements.
	2.5 Stock levels are maintained and replacement parts/items are ordered in accordance with site/enterprise requirements
3 Complete the Work	3.1 Logbooks are kept in accordance with

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ELEMENT	PERFORMANCE CRITERIA	
		site/enterprise requirements.
	3.2	Toolstore area is cleared of waste, and secured in accordance with site/enterprise procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of performing tool store duties.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01- PO237B Tool store duties

Evidence shall show that knowledge has been acquired for safe working practices of:

T1 Relevant Environmental, Occupational Health and Safety legislation and regulations

T2 Relevant plant and equipment, its location and operation

T3 Introduction to and typical arrangements of power production plant

T4 Tool names, types and their uses

T5 Site/enterprise ordering procedures

T6 Site/enterprise documentation procedures

T7 Workshop tool storage requirements

T8 Tool maintenance requirements

T9 Tool attachments and accessories

KS02- PO237B Tool store duties

Specific skills needed to achieve the Performance Criteria:

T1 Interpret technical drawings and manufacturers manuals

T2 Apply relevant state and territory regulations

T3 Apply ordering procedures

T4 Maintain logbooks and records

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REQUIRED SKILLS AND KNOWLEDGE

T5 Apply tool maintenance procedures

T6 Issue tools and associated equipment

T7 Communicate effectively

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of the competency standard unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature to minimise error in judgment.

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Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each Element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the Essential Knowledge and Associated Skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti-Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Knowledge and application of relevant sections of: Occupational, health and safety legislation; Statutory

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legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
- Preparation and planning of work
- Issuing and maintaining tools and associated equipment
- Completion of work procedures
- Dealing with an unplanned event by drawing on Essential Knowledge and Skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this competency standard unit

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and method and in a variety of environments.

Method of assessment

9.4)

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this competency standard unit

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applies. This requires that the specified Essential Knowledge and Associated Skills be assessed in a structured environment, which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the Essential Knowledge and Skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Tools and associated equipment may include hand tools, portable electric tools and their attachments, cutting tips for lathes, mills and other metal removal machines, grinding wheels, special steel, etc.

Tooling may be permanent of disposable.

Logbooks may include those that are used for issue and receipt of goods, recording, stock levels, and for recording inspection, maintenance and disposal of defective tools and their equipment.

Maintenance may include cleaning, greasing, cutter changing, de-burring etc.

Worksite environment may be affected by nearby plant or processes, e.g. heat, dust, noise.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given inSection 2.1 Preliminary Information and Glossaries.

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Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations

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UEPOPS238B Maintain battery banks and cells

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to undertake the maintenance of all battery cells/banks including hydrogen generation cells/banks.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

Pre-Requisites

Prerequisite Unit(s) **4)**

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Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 2 Writing 2 Numeracy 2

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Plan and prepare for the work	1.1	Work requirements are identified from request/work orders or equivalent and clarified/confirmed with appropriate parties or by site inspection
	1.2	Occupational Health and Safety standards, statutory requirements, relevant Australian standards, codes of practice, manufacturers' specifications, environmental requirements and enterprise procedures are identified, applied and monitored throughout the work procedure
	1.3	Resources required to satisfy the work plan are identified, obtained and inspected for compliance with the job specifications
	1.4	Relevant plans, drawings and text are selected and interpreted in accordance with the work plan
	1.5	Correct size, type and quantity of materials/components are determined, obtained and inspected for compliance with the job specifications
	1.6	Work is planned in detail including sequencing and prioritising and considerations made, where appropriate, for the maintenance of plant security and capacity in accordance with system/site requirements
	1.7	Co-ordination requirements, including requests for isolations where appropriate, are resolved with others involved, affected or required by the work
	1.8	Potential hazards are identified and prevention and/or control measures are selected in accordance with the work plan and site procedures
	1.9	Work area is prepared in accordance with work requirements and site procedures
	1.10	Where appropriate, the teams and individuals

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ELEMENT	PERFORMANCE CRITERIA	
		roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2 Test the equipment	2.1	Battery plant/equipment is inspected prior to testing to ensure absence of any damage, defects and/or signs of abnormalities in accordance with the work plan
	2.2	Tests are carried out to determine battery/plant condition in accordance with site requirements and the work plan
	2.3	Test results are recorded and analysed to determine battery/plant capabilities in accordance with site requirements and the work plan
	2.4	Test and measurement instruments are used in accordance with manufacturer's instructions and the work plan
	2.5	Faults found are noted and reported to appropriate parties in accordance with the work plan
3 Maintain the equipment	3.1	Required isolations are confirmed where appropriate in accordance with site requirements
	3.2	Equipment is maintained using appropriate plans, drawings and texts in accordance with the work plan
	3.3	Equipment is maintained in conjunction with others involved in, or affected by, the work in accordance with the work plan
	3.4	Cleaning and/or adjustments required are carried out to ensure equipment operates within requirements in accordance with the work plan
	3.5	Maintenance and resets/adjustments are carried out, mindful of effects on, or unnecessary loss of, other equipment
	3.6	Final job inspection is carried out and permits relinquished in accordance with the work plan.

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ELEMENT	PERFORMANCE CRITERIA	
4 Complete the work	4.1	Work is completed and appropriate personnel notified in accordance with site/enterprise requirements
	4.2	Work area is cleared of waste, cleaned, restored and secured in accordance with site/enterprise procedures
	4.3	Plant, tools and equipment are maintained and stored in accordance with site/enterprise procedures
	4.4	Work completion details are finalised in accordance with site/enterprise procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of maintaining battery banks and cells.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO238B Battery banks and cells

Evidence shall show that knowledge has been acquired for safe working practices of:

T1 Relevant Environmental, Occupational Health and Safety legislation and regulations

T2 Relevant plant and equipment, its location and operation

T3 Technical drawings and manufacturers manuals

T4 Introduction to and typical arrangements of power production plant

T5 Equipment and material required to perform the work

T6 Isolation procedures

T7 Battery plant and operation of its equipment

T8 Test and measurement instruments

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REQUIRED SKILLS AND KNOWLEDGE

T9 Performance and function of D.C. electrical systems

T10 Fault finding and diagnostic techniques

T11 Hazardous materials

T12 Battery test procedures

T13 Repair techniques

T14 Electrical principles

T15 Engineering and work shop practice

KS02-PO238B Battery banks and cells

Specific skills needed to achieve the Performance Criteria:

T1 Interpret technical drawings and manufacturers manuals

T2 Use hand and portable power tools

T3 Use test and measurement instruments

T4 Identify faults

T5 Apply fault finding and diagnostic techniques

T6 Repair faults

T7 Maintain battery banks

T8 Select materials for the job

T9 Handle hazardous materials

T10 Carry out work completion details

T11 Apply data analysis techniques and tools

T12 Communicate effectively.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of the competency standard unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

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Overview of Assessment **9.1)**

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit **9.2)**

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered

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holistically. Each Element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the Essential Knowledge and Associated Skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti-Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Knowledge and application of relevant sections of: Occupational, health and safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Preparation and planning of work
  - Testing techniques and procedures
  - Maintenance techniques and procedures
  - Completion of work procedures
  - Dealing with an unplanned event by drawing on Essential Knowledge and Skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

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- OHS policy and work procedures and instructions
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this competency standard unit

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and method and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this competency standard unit applies. This requires that the specified Essential Knowledge and Associated Skills be assessed in a structured environment, which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the Essential Knowledge and Skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

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Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Types of equipment supplied by batteries may include emergency lighting systems, alarm and protection systems and process management systems.

Types of batteries may include lead acid, ni-cad and hydrogen gen cells.

Battery plant work area may be subject to environmental hazards, e.g. hydrogen gas and corrosive acids.

Work completion details may include plant and maintenance records, job cards, check sheets and on device labelling updates.

Isolations can refer to electrical/mechanical or other associated processes.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations

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UEPOPS240B Operate and monitor fuel supply (coal)

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to operate, inspect and monitor coal delivery systems to the generating unit storage bunker.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

Pre-Requisites

Prerequisite Unit(s) **4)**

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Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 2 Writing 2 Numeracy 2

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and prepare plant for operation	1.1 Safety issues are identified to comply with enterprise/site and legislative requirements
	1.2 Work, plant and resource requirements are identified from relevant personnel, information and documentation
	1.3 Quality assurance requirements are identified in accordance with enterprise/site requirements
	1.4 Documentation to determine plant status is assessed and evaluated
	1.5 Localised plant inspection and field preparation for service is carried out in accordance with manufacturer's and enterprise/site procedures
	1.6 Plant operational pre-requisites are established in accordance with manufacturer's and enterprise/site procedures
	1.7 Sequence for recommissioning of plant is determined to suit existing circumstances in accordance with enterprise/site requirements
	1.8 Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2 Operate coal delivery plant	2.1 Plant is operated in accordance with enterprise and manufacturer's operating procedures
	2.2 Plant is monitored and observed to detect deviations from normal operating conditions
	2.3 Corrective actions taken or reported, to rectify abnormalities, are in accordance with industry standards and site requirements
	2.4 Correct action is taken when response is not in accordance with documentation, plant integrity or personnel safety requirements

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ELEMENT		PERFORMANCE CRITERIA	
		2.5	Plant is returned to required operational status upon completion of test
3	Analyse plant faults	3.1	Causes of abnormal plant operating conditions are identified by analysing the technical and operational information in a logical and sequential manner
		3.2	Corrective action taken is in accordance with enterprise/site procedures
		3.3	Plant integrity and personnel safety is maintained through consultation with appropriate personnel, and with reference to plant, technical and operational documentation
4	Monitor and inspect plant	4.1	Plant to be monitored/inspected is physically identified
		4.2	Plant is monitored/inspected for normal operation or to detect deviations
		4.3	Corrective action taken is in accordance with enterprise/site procedures
		4.4	Appropriate personnel are notified when defects are detected
5	Complete documentation	5.1	Documentation is updated and plant problems, movements, and abnormalities and status are reported and logged in accordance with enterprise/site procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of operating and monitoring fuel supply (coal).

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

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REQUIRED SKILLS AND KNOWLEDGE

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO240B Fuel supply (coal)

Evidence shall show that knowledge has been acquired for safe working practices of:

T1 Relevant Environmental, Occupational Health and Safety legislation and regulations

T2 Enterprise procedures

T3 Plant drawings and manufacturers manuals

T4 Introduction to and typical arrangements of power production plant

T5 Relevant plant and equipment, its location and operating parameters

T6 Plant status

T7 Enterprise recording procedures

T8 Coal Plant equipment designs and characteristics

T9 Coal handling procedures

T10 Control and data acquisition systems

T11 Lubrication and bearings

T12 Coal bunker designs and characteristics

T13 Electrical principles

T14 Transformers types and characteristics

T15 Electric motors types and characteristics

T16 Switchgear types and characteristics

T17 Electrical protection types and characteristics

KS02-PO240B Fuel supply (coal)

Specific skills needed to achieve the Performance Criteria:

T1 Interpret plant drawings and manufacturers manuals

T2 Identify plant status

T3 Operate coal delivery plant

T4 Apply diagnostic and testing techniques

T5 Identify and respond to abnormal plant operating conditions

T6 Plan and prioritise work

T7 Use relevant hand tools

T8 Communicate effectively

T9 Apply data analysis techniques and tools

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REQUIRED SKILLS AND KNOWLEDGE

T10 Operate in a team

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of the competency standard unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered

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will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit **9.2)**

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each Element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the Essential Knowledge and Associated Skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti-Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Knowledge and application of relevant sections of: Occupational, health and safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures

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- Preparation and planning of work
- Operation of coal delivery plant
- Operationally testing plant
- Analysing plant faults
- Monitoring plant operation
- Dealing with an unplanned event by drawing on Essential Knowledge and Skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this competency standard unit

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and method and in a variety of environments.

Method of assessment

9.4)

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is

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expected in the Industry to which this competency standard unit applies. This requires that the specified Essential Knowledge and Associated Skills be assessed in a structured environment, which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the Essential Knowledge and Skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Systems, plant and or equipment may include electrical supply switchboard(s) and transformers, conveyors, motors and motor starters, hydraulic systems, pumps, storage bins/dry storage bunkers and associated equipment, vibratory feeders, trippers, check weigh bins, valves and actuators (electric, hydraulic and pneumatic), lubricating and oil conditioning systems, fire services system, dust suppression system, supervisory, alarm, protection and control equipment.

Safety standards may include relevant sections of Occupational Health and Safety legislation, enterprise safety rules, relevant state and federal legislation and national standards for plant.

Information and documentation sources may include verbal or written communications; enterprise safety rules documentation/forms; equipment and alarm manuals; dedicated computer equipment; enterprise/site standing and operating instructions; enterprise/site log books; equipment manufacturer’s operation and maintenance manuals.

Technical and operational indicators may include stimuli (audio, smell, touch, visual), remote or local indicators and recorders, computers and alarms (visible and or

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RANGE STATEMENT

audible).

Communications may be by means of telephone, two way radio, pager, public address system, facsimile, computer (electronic mail) and operating log (written or verbal).

Tests may include alarm and protection tests, performance tests, stand-by plant tests and post maintenance operating tests.

Appropriate personnel to consult, give or receive direction may include supervisor/team leader or equivalent, technical and engineering officers or equivalent, maintenance staff, contractor personnel, other production staff and coal handling plant operators.

Test, fault finding and operating tools may include hand tools and basic electronic testing equipment.

Operating environment may be during inclement or otherwise harsh weather conditions, in wet/noisy/dusty/hot areas or during night periods.

Faults and abnormal operating conditions may include motor/pump/ actuator/valve/dampers failure/malfunctions, control equipment failure/ malfunctions, loss of electrical supply to plant and equipment, loss of conveyor(s)/restricted availability, loss of or restricted availability of mobile plant and wet weather operation.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations

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UEPOPS241B Operate and monitor ash and dust disposal plant

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to operate, inspect and monitor ash and dust disposal plants associated with a coal fired power station.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

Pre-Requisites

Prerequisite Unit(s) **4)**

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Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 2 Writing 2 Numeracy 2

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT		PERFORMANCE CRITERIA	
1	Plan and prepare plant for operation	1.1	Safety issues are identified to comply with enterprise/site and legislative requirements
		1.2	Work requirements are identified from relevant personnel and documentation
		1.3	Localised plant inspection and field preparation for service is carried out in accordance with manufacturer's and enterprise/site procedures
		1.4	Plant operational pre-requisites are established in accordance with manufacturer's and enterprise/site procedures
		1.5	Sequence for recommissioning of plant is determined to suit existing circumstances in accordance with enterprise/site requirements
		1.6	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2	Operate plant	2.1	Plant is operated in accordance with enterprise and manufacturer's operating procedures
		2.2	Plant is monitored and observed to detect deviations from normal operating conditions
		2.3	Corrective actions taken or reported, to rectify abnormalities, are in accordance with industry standards and site requirements
3	Test plant operation	3.1	Tests are performed in accordance with defined procedures applicable to the operational test
		3.2	Plant is observed for correct operational response
		3.3	Corrective action is taken when response is not in accordance with documentation, plant integrity or personnel safety requirements
	Respond to abnormal	3.4	Plant is returned to required operational status

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ELEMENT		PERFORMANCE CRITERIA	
	plant operation		upon completion of test
4		4.1	Causes of abnormal plant operating conditions are identified by analysing the technical and operational information in a logical and sequential manner
		4.2	Corrective action taken is in accordance with enterprise/site procedures
		4.3	Plant integrity and personnel safety is maintained through consultation with appropriate personnel, and with reference to plant, technical and operational documentation
5	Monitor and inspect plant	5.1	Plant to be monitored/inspected is physically identified
		5.2	Plant is monitored/inspected for normal operation or to detect deviations
		5.3	Corrective action taken is in accordance with enterprise/site procedures
		5.4	Appropriate personnel are notified when defects are detected
6	Complete documentation	6.1	Documentation is updated and plant problems, movements, and abnormalities and status are reported and logged in accordance with enterprise/site procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of operating and monitoring ash and dust disposal plants.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

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REQUIRED SKILLS AND KNOWLEDGE

KS01-PO241B Ash and dust disposal plant

Evidence shall show that knowledge has been acquired for safe working practices of:

T1 Relevant Environmental, Occupational Health and Safety legislation and regulations

T2 Enterprise procedures

T3 Plant drawings and manufacturers manuals

T4 Introduction to and typical arrangements of power production plant

T5 Relevant plant and equipment, its location and operating parameters

T6 Plant status

T7 Enterprise recording procedures

T8 Control and data acquisition systems

T9 Computers and software

T10 Emergency procedures

T11 Electric motor types and characteristics

T12 Pump and compressor types and characteristics

T13 Valve, damper and actuator types and characteristics

T14 Properties and types of ash formations

T15 Properties of matter

T16 Lubrication and bearings

T17 Bottom ash types and characteristics

T18 Fly ash types and characteristics

T19 Ash removal systems types and characteristics

T20 Electrical principles

T21 Switchgear types and characteristics

T22 Electrical protection types and characteristics

KS02-PO241B Ash and dust disposal plant

Specific skills needed to achieve the Performance Criteria:

T1 Interpret plant drawings and manufacturers manuals

T2 Apply enterprise recording procedures

T3 Organise resources

T4 Operate ash and dust disposal plant

T5 Apply diagnostic and testing techniques

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REQUIRED SKILLS AND KNOWLEDGE

T6 Identify and respond to abnormal plant operating conditions

T7 Plan and prioritise work

T8 Use relevant hand tools

T9 Communicate effectively

T10 Apply data analysis techniques and tools

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of the competency standard unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical

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equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each Element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the Essential Knowledge and Associated Skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti-Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of

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contexts from the prescribed items below:

- Knowledge and application of relevant sections of: Occupational, health and safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
- Preparation and planning of work
- Operation of ash and dust disposal plant
- Operationally testing plant
- Analysing plant faults
- Monitoring plant operation
- Dealing with an unplanned event by drawing on Essential Knowledge and Skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment **9.3)**

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this competency standard unit

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and method and in a variety of environments.

Method of assessment **9.4)**

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This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this competency standard unit applies. This requires that the specified Essential Knowledge and Associated Skills be assessed in a structured environment, which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the Essential Knowledge and Skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Systems, plant and/or equipment may include electrical supply switchboard(s) and transformers; electrical motors; valves; dampers and actuators (electric, hydraulic, manual and pneumatic); lubricating and oil conditioning systems; supervisory, alarm, protection and control equipment; boiler ash/dust hopper and ash/dust extraction equipment; sluiceway and sluiceway equipment; ash crusher; ash and dust slurry pumps; ash, dust and dam water recovery plant; hydraulic power oil unit; dust suppression plant; dams; and transportation systems

Safety standards may include relevant sections of Occupational Health and Safety legislation, enterprise safety rules, relevant state and federal legislation, national standards for plant, Australian standards.

Information and documentation sources may include verbal or written

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RANGE STATEMENT

communications; enterprise safety rules documentation; enterprise operating instructions; manufacturer's operational and maintenance manuals; equipment and alarm manuals; dedicated computer equipment; enterprise standing instructions and plant notes; and enterprise log books.

Technical and operational indicators may include stimuli (audio, smell, touch, visual), remote or local indicators and recorders and alarms (visible and or audible).

Communications may be by means of, telephone, two way radio, pager, computer (electronic mail), operating log (written or verbal) and public address system.

Tests may include motor direction checks, stand-by plant tests, and performance tests and pump rotation checks.

Appropriate personnel to consult, give or receive direction may include supervisor/team leader or equivalent, power plant operations personnel, technical and engineering officers or equivalent, maintenance staff, contractor personnel and other production staff.

Test, fault finding and operating tools may include high voltage testers, proving dead equipment, power or hand tools.

Operating environment may be during inclement or otherwise harsh weather conditions, in wet/noisy/dusty/hot areas and during continuous operation.

Faults and abnormal operating conditions may include motor/pump/actuator /valve/dampers failure/malfunctions, control equipment failure/malfunctions, loss of electrical supply to plant and equipment, loss/low cooling air/water, low lubricating/power oil flow to auxiliary plant/equipment, clinker build ups (manual removal), excessive vibration pumps/motors, loss/low ejector water flow, loss of pump gland sealing water, high/low pit levels, blocked sluiceways and blocked/burst lines.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations

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UEPOPS242B Operate and monitor dust collection plant

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to operate, inspect and monitor dust collection plant associated with a power station.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

Pre-Requisites

Prerequisite Unit(s) **4)**

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Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 2 Writing 2 Numeracy 2

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Plan and prepare work	1.1	Safety issues are identified to comply with enterprise/site and legislative requirements
	1.2	Work requirements are identified from relevant personnel and documentation
	1.3	Localised plant inspection and field preparation for service are carried out in accordance with manufacturer's and enterprise/site procedures
	1.4	Plant operational pre-requisites are established in accordance with manufacturer's and enterprise/site procedures
	1.5	Sequence for recommissioning of plant is determined to suit existing circumstances in accordance with enterprise/site requirements
	1.6	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2 Operate plant	2.1	Plant is operated in accordance with enterprise and manufacturer's operating procedures
	2.2	Plant is monitored and observed to detect deviations from normal operating conditions
	2.3	Corrective actions taken or reported, to rectify abnormalities are in accordance with industry standards and site requirements
3 Test plant operation	3.1	Tests are performed in accordance with defined procedures applicable to the operational test
	3.2	Plant is observed for correct operational response
	3.3	Corrective action is taken when response is not in accordance with documentation, plant integrity or personnel safety requirements
	3.4	Plant is returned to required operational status

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ELEMENT		PERFORMANCE CRITERIA	
			upon completion of test
4	Analyse plant faults	4.1	Causes of abnormal plant operating conditions are identified by analysing the technical and operational information in a logical and sequential manner
		4.2	Corrective action taken is in accordance with enterprise/site procedures
		4.3	Plant integrity and personnel safety is maintained through consultation with appropriate personnel, and with reference to plant, technical and operational documentation
5	Monitor and inspect plant	5.1	Plant to be monitored/inspected is physically identified
		5.2	Plant is monitored/inspected for normal operation or to detect deviations
		5.3	Corrective action taken is in accordance with enterprise/site procedures
		5.4	Appropriate personnel are notified when defects are detected
6	Complete documentation	6.1	Documentation is updated and plant problems, movements, and abnormalities and status are reported and logged in accordance with enterprise/site procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of operating and monitoring dust collection plants.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

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REQUIRED SKILLS AND KNOWLEDGE

KS01-PO242B Dust collection plant

Evidence shall show that knowledge has been acquired for safe working practices of:

T1 Relevant Environmental, Occupational Health and Safety legislation and regulations

T2 Enterprise procedures

T3 Plant drawings and manufacturers manuals

T4 Introduction to and typical arrangements of power production plant

T5 Relevant plant and equipment, its location and operating parameters

T6 Electric motor types and characteristics

T7 Pump and compressor types and characteristics

T8 Valve, damper and actuator types and characteristics

T9 Switchgear types and characteristics

T10 Electrical protection types and characteristics

T11 Plant status

T12 Enterprise recording procedures

T13 Control and data acquisition systems

T14 Properties of matter

T15 Lubrication and bearings

T16 Electrical principles

T17 Auxiliary supply systems

T18 Safe operating principles

KS02-PO242B Dust collection plant

Specific skills needed to achieve the Performance Criteria:

T1 Interpret plant drawings and manufacturers manuals

T2 Apply enterprise recording procedures

T3 Identify plant status

T4 Prepare plant/equipment for operation

T5 Organise resources

T6 Operate dust collection plant

T7 Apply diagnostic and testing techniques

T8 Identify and respond to abnormal plant operating conditions

T9 Plan and prioritise work

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REQUIRED SKILLS AND KNOWLEDGE

T10 Use relevant hand tools

T11 Communicate effectively

T12 Apply data analysis techniques and tools

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of the competency standard unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment	**9.1)**

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Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

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Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each Element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the Essential Knowledge and Associated Skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti-Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Knowledge and application of relevant sections of OH&S legislation, statutory legislation, enterprise/site safety procedures and enterprise/site emergency procedures
  - Preparation and planning of work, Operation of electrostatic dust collection plant, Operationally testing plant, Analysing plant faults, Monitoring plant operation
  - Dealing with an unplanned event by drawing on Essential Knowledge and Skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment **9.3)**

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a

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workplace. This should include:

- OHS policy and work procedures and instructions
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this competency standard unit

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and method and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:
Competent performance with inherent safe working practices is expected in the Industry to which this competency standard unit applies. This requires that the specified Essential Knowledge and Associated Skills be assessed in a structured environment, which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the Essential Knowledge and Skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

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Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Systems, plant and or equipment may include electrical supply switchboard(s) and transformers; fans; electrical motors; valves, dampers and actuators (electric, hydraulic, manual and pneumatic); lubricating and oil conditioning systems; supervisory, alarm, protection and control equipment; dust ejectors; electrostatic precipitators; bag filters; hoppers and associated equipment; sluice water systems; and chemical injection systems

Safety standards may include relevant sections of Occupational Health and Safety legislation, enterprise safety rules, relevant state and federal legislation, national standards for plant and Australian standards

Information and documentation sources may include verbal or written communications; enterprise safety rules documentation; enterprise operating instructions; manufacturer's operational and maintenance manuals; equipment and alarm manuals; dedicated computer equipment; enterprise standing instructions and plant notes; and enterprise log books

Technical and operational indicators may include stimuli (audio, smell, touch, visual), remote or local indicators and recorders and alarms (visible and or audible)

Communications may be by means of telephone, two way radio, pager, computer (electronic mail), operating log (written or verbal) and public address system.

Tests may include motor direction checks, stand-by plant "cut-in" tests, performance tests and alarm initiation tests.

Appropriate personnel to consult, give or receive direction may include, supervisor/team leader or equivalent, power plant operations personnel, technical and engineering officers or equivalent, maintenance staff, contractor personnel and other production staff or equivalent.

Test, fault finding and operating tools may include high voltage testers, proving dead equipment, power or hand tools.

Operating environment may be during inclement or otherwise harsh weather conditions, in wet/noisy/dusty/hot areas and during continuous operation.

Faults and abnormal operating conditions may include motor/pump/ actuator/valve/dampers failure/malfunctions, control equipment failure/ malfunction, loss of electrical supply to plant and equipment, excessive vibration of pumps/motors, loss/low ejector water flow, broken "wire" in cell, loss of chemical injection and chemical storage/delivery plant malfunctions, low/loss air pressure, loss of pump gland sealing water, blocked ejector strainers, blocked hoppers and rapper failure

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RANGE STATEMENT

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations

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UEPOPS243B Operate air conditioning plant

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to operate and inspect all air conditioning plant.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

Pre-Requisites

Prerequisite Unit(s) **4)**

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Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 2 Writing 2 Numeracy 2

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Plan and prepare work	1.1	Safety issues are identified to comply with enterprise/site requirements
	1.2	Work requirements are identified from relevant personnel and documentation
	1.3	Documentation to determine plant status is assessed and evaluated
	1.4	Localised plant inspection and field preparations for service are carried out in accordance with enterprise/site operational requirements
	1.5	Plant operational pre-requisites are established in accordance with manufacturer's and enterprise/site requirements
	1.6	Sequence for recommissioning of plant is determined to suit existing circumstances in accordance with enterprise/site requirements
	1.7	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2 Operate plant	2.1	Plant is operated in accordance with enterprise, site and manufacturer's operating procedures
	2.2	Plant is monitored and observed to detect deviations from normal operating conditions
	2.3	Corrective actions taken to rectify abnormalities are in accordance with industry standards and site requirements
	2.4	Plant to be removed from service is identified and removed from service in accordance with enterprise and site requirements
	2.5	Corrective actions are taken in accordance with enterprise safety rules and site requirements when abnormalities are identified during the removal from service

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ELEMENT	PERFORMANCE CRITERIA	
3 Test plant operation	3.1	Tests are performed in accordance with defined procedures applicable to the operational test
	3.2	Plant is observed for correct operational response
	3.3	Corrective action is taken when response is not in accordance with documentation, plant integrity or personnel safety requirements
	3.4	Plant is returned to required operational status upon completion of test
4 Analyse plant faults	4.1	Causes of abnormal plant operating conditions are identified by analysing the technical and operational information in a logical and sequential manner
	4.2	Corrective action taken is in accordance with enterprise procedures
	4.3	Plant integrity and personnel safety is maintained through consultation with appropriate personnel, and with reference to plant, technical and operational documentation
5 Monitor and inspect plant	5.1	Plant to be monitored/inspected is physically identified
	5.2	Plant is monitored/inspected for normal operation or to detect deviations
	5.3	Corrective action taken is in accordance with enterprise/site procedures
	5.4	Appropriate personnel are notified when defects are detected
6 Complete documentation	6.1	Documentation is updated and plant problems, movements, abnormalities and status are reported and logged in accordance with enterprise/site procedures

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of operating air conditioning plants.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01- PO243B Air conditioning plant

Evidence shall show that knowledge has been acquired for safe working practices of:

T1 Relevant Environmental, Occupational Health and Safety legislation and regulations

T2 Enterprise procedures

T3 Plant drawings and manufacturers manuals

T4 Introduction to and typical arrangements of power production plant

T5 Relevant plant and equipment, its location and operating parameters

T6 Electric motor types and characteristics

T7 Pump and compressor types and characteristics

T8 Valve, damper and actuator types and characteristics

T9 Switchgear types and characteristics

T10 Air conditioner systems types and characteristics

T11 Plant status

T12 Enterprise recording procedures

T13 Control, supervisory and data acquisition systems

T14 Emergency procedures

T15 Legionella bacteria awareness

KS02- PO243B Air conditioning plant

Specific skills needed to achieve the Performance Criteria:

T1 Interpret plant drawings and manufacturers manuals

T2 Apply enterprise recording procedures

T3 Identify plant status

T4 Prepare plant/equipment for operation

T5 Organise resources

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REQUIRED SKILLS AND KNOWLEDGE

T6 Operate air conditioning plant

T7 Apply diagnostic and testing techniques

T8 Identify and respond to abnormal plant operating conditions

T9 Plan and prioritise work

T10 Use relevant hand tools

T11 Communicate effectively

T12 Apply data analysis techniques and tools

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of the competency standard unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being

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assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each Element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the Essential Knowledge and Associated Skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti-Discrimination

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legislation, regulations, polices and workplace procedures

- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Knowledge and application of relevant sections of: Occupational, health and safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Preparation and planning of work
  - Operation of air conditioning plant
  - Operationally testing plant
  - Analysing plant faults
  - Monitoring plant operation
  - Applying knowledge of legionella bacteria control procedures
  - Dealing with an unplanned event by drawing on Essential Knowledge and Skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this competency standard unit

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and method and in a variety of environments.

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Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this competency standard unit applies. This requires that the specified Essential Knowledge and Associated Skills be assessed in a structured environment, which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the Essential Knowledge and Skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

For optimisation of training and assessment effort, competence in this unit may be assessed concurrently with the unit(s) as stated in Section 3.1 as well as the following units:

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Systems, plant and/or equipment may include electrical supply switchboard(s) and transformers; air conditioner compressors; chillers and associated cooling plant; air fans; humidifiers; heaters and filters; electrical motors; valves, actuators and dampers (electric, hydraulic, pneumatic and manual); supervisory, alarm, protection and control equipment; and chemical dosing equipment.

Safety standards may include relevant sections of Occupational Health and Safety legislation, enterprise safety rules, relevant state and federal legislation, national standards for plant and environmental legislation.

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RANGE STATEMENT

Information and documentation sources may include verbal and written communications, enterprise/site safety rules documentation, enterprise operating instructions, manufacturer's operation and maintenance manuals, equipment and alarm manuals, dedicated computer equipment, enterprise standing instructions and plant notes and enterprise log books.

Technical and operational indicators may include stimuli (audio, smell, touch, visual), local indicators and recorders and alarms (visible and or audible).

Communications may be by means of telephone, two way radio, pager, public address system, facsimile, computer (electronic mail) and operating log (written or verbal).

Tests may include motor direction checks, stand-by plant "cut-in" tests and performance tests.

Appropriate personnel to consult, give or receive direction may include supervisor/team leader or equivalent, power plant operations personnel or equivalent, technical and engineering officers or equivalent, contractor staff and maintenance staff.

Test, fault finding and operating tools may include hand and power tools and proving dead equipment.

Operating environment may be during inclement or otherwise harsh weather conditions, in wet/noisy/dusty/hot areas and during continuous operation.

Faults and abnormal operating conditions may include motor/pump/ actuator/valve/fan failure/malfunctions, control equipment failures/ malfunctions, loss of electrical supply to plant and equipment, excessive vibration pumps/motors, cooling tower abnormal operation, legionella bacteria count high and refrigerant compressor malfunction/failure.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations

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UEPOPS244B Operate and monitor site services water systems

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to operate, inspect and monitor of site services water systems, excluding fixed fire water services.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

Pre-Requisites

Prerequisite Unit(s) **4)**

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Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 2 Writing 2 Numeracy 2

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Plan and prepare work	1.1	Safety issues are identified to comply with enterprise/site requirements
	1.2	Work requirements are identified from relevant personnel and documentation
	1.3	Documentation to determine plant status is assessed and evaluated
	1.4	Localised plant inspection and field preparations for service are carried out in accordance with manufacturer's and enterprise procedures
	1.5	Plant operational pre-requisites are established in accordance with manufacturer's and enterprise procedures
	1.6	Sequence for recommissioning of plant is determined to suit existing circumstances in accordance with enterprise requirements
	1.7	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2 Operate plant	2.1	Plant is operated in accordance with enterprise and manufacturer's operating procedures
	2.2	Plant is monitored and observed to detect deviations from normal operating conditions
	2.3	Corrective actions are taken to rectify abnormalities in accordance with manufacturer's and enterprise procedures
3 Test plant operation	3.1	Tests are performed in accordance with defined procedures applicable to the operational test
	3.2	Plant is observed for correct operational response
	3.3	Corrective action is taken when response is not in accordance with documentation, plant

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ELEMENT		PERFORMANCE CRITERIA	
			integrity or personnel safety requirements
		3.4	Plant is returned to required operational status upon completion of test
4	Analyse plant faults	4.1	Causes of abnormal plant operating conditions are identified by analysing the technical and operational information in a logical and sequential manner
		4.2	Corrective action taken is in accordance with enterprise procedures
		4.3	Plant integrity and personnel safety are maintained through consultation with appropriate personnel, and with reference to plant, technical and operational documentation
5	Monitor and inspect plant	5.1	Plant to be monitored/inspected is physically identified
		5.2	Plant is monitored/inspected for normal operation or to detect deviations.
		5.3	Corrective action taken is in accordance with enterprise procedures
		5.4	Appropriate personnel are notified when defects are detected
6	Complete documentation	6.1	Documentation is updated and plant problems, movements, abnormalities and status are reported and logged in accordance with enterprise/site procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of operating and monitoring site services water systems.

All knowledge and skills detailed in this unit should be contextualised to current

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REQUIRED SKILLS AND KNOWLEDGE

industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO244B Site services water systems

Evidence shall show that knowledge has been acquired for safe working practices of:

T1 Relevant Environmental, Occupational Health and Safety legislation and regulations

T2 Enterprise procedures

T3 Plant drawings and manufacturers manuals

T4 Introduction to and typical arrangements of power production plant

T5 Relevant plant and equipment, its location and operating parameters

T6 Electric motor types and characteristics

T7 Pump and compressor types and characteristics

T8 Valve, damper and actuator types and characteristics

T9 Switchgear types and characteristics

T10 Electrical protection types and characteristics

T11 Plant status

T12 Enterprise recording procedures

T13 Control and data acquisition systems

T14 Emergency procedures

T15 Lubrication and bearings

T16 Safe operating principles

KS02-PO244B Site services water systems

Specific skills needed to achieve the Performance Criteria:

T1 Interpret plant drawings and manufacturers manuals

T2 Apply enterprise recording procedures

T3 Identify plant status

T4 Prepare plant/equipment for operation

T5 Organise resources

T6 Operate site services water systems

T7 Apply diagnostic and testing techniques

T8 Identify and respond to abnormal plant operating conditions

T9 Plan and prioritise work

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REQUIRED SKILLS AND KNOWLEDGE

T10 Use relevant hand tools

T11 Communicate effectively

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of the competency standard unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

9.1)

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature to minimise error in judgment.

Activities associated with normal every day work have a bearing

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on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each Element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the Essential Knowledge and Associated Skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti-Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Knowledge and application of relevant sections of: Occupational, health and safety legislation; Statutory legislation; Enterprise/site safety procedures;

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Enterprise/site emergency procedures

- Preparation and planning of work
- Operation of site services water systems
- Operationally testing plant
- Analysing plant faults
- Monitoring plant operation
- Dealing with an unplanned event by drawing on Essential Knowledge and Skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this competency standard unit

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and method and in a variety of environments.

Method of assessment

9.4)

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

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Competent performance with inherent safe working practices is expected in the Industry to which this competency standard unit applies. This requires that the specified Essential Knowledge and Associated Skills be assessed in a structured environment, which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the Essential Knowledge and Skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

For optimisation of training and assessment effort, competence in this unit may be assessed concurrently with the unit(s) as stated in Section 3.1 as well as the following units:

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Systems, plant and/or equipment may include electrical supply switchboards; chemical treatment systems; raw water supply; town water supply; supervisory, alarm, protection and control equipment; high and low pressure pump; valves and actuators (electric, hydraulic, pneumatic and manual); compressed air systems; filters; strainers; and pressure control devices.

Safety standards may include relevant sections of Occupational Health and Safety legislation, enterprise safety rules, relevant state and federal legislation, national standards for plant and environmental legislation.

Information and documentation sources may include verbal and written communications, enterprise/site safety rules documentation/form(s), equipment and alarm manuals, dedicated computer equipment, enterprise/site standing and operating instructions, enterprise/site log book and manufacturer’s operation and maintenance manuals.

Technical and operational indicators may include stimuli (audio, smell, touch, visual), local indicators and recorders, computers and alarms (visible and or audible).

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RANGE STATEMENT

Communications may be by means of telephone, two way radio, pager, public address system, facsimile, computer (electronic mail) and operating log (written or verbal).

Tests may include stand-by plant tests, post maintenance operating tests and tests for water quality.

Appropriate personnel to consult, give or receive direction may include, supervisor/team leader or equivalent, power system control personnel or equivalent, contractor and specialist personnel, maintenance staff and power plant operations personnel.

Test, fault finding and operating tools may include hand and power tools and control system equipment.

Operating environment may be during inclement or otherwise harsh weather conditions, in wet/noisy/dusty/hot areas and during continuous operation.

Faults and abnormal operating conditions may include motor/pump/ actuator/valve/damper failure/malfunction, control equipment failure/ malfunctions, loss of electrical supply to plant and equipment, excessive vibration pumps/motors, high filter/strainer differentials, loss of major auxiliary, loss of control medium and water quality.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations

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UEPOPS245B Conduct chemical batching operations

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to conduct mixing of chemicals for the treatment of a primary substance.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

Pre-Requisites

Prerequisite Unit(s) **4)**

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Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 2 Writing 2 Numeracy 2

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and prepare work	1.1 Work requirements are identified from request/work orders or equivalent and clarified/confirmed with appropriate parties
	1.2 Occupational Health and Safety standards, statutory requirements, relevant Australian standards, codes of practice, manufacturers' specifications, environmental requirements and enterprise procedures are identified, applied and monitored throughout the work procedure
	1.3 Potential hazards are identified and prevention and/or control measures are selected in accordance with the work plan and site procedures
	1.4 Resources required to satisfy the work plan are identified, obtained and inspected for compliance with the job specifications
	1.5 Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2 Perform chemical batching	2.1 Relevant staff are notified on commencement and completion of work in accordance with enterprise/site procedures
	2.2 Amount of chemical needed is calculated in accordance with job requirements
	2.3 Correct chemical is added to tank or plant in accordance with job requirements
	2.4 Demineralised water is added to correct level in accordance with job requirements
	2.5 Mixing device is operated in accordance with job requirements
	2.6 Work site is left in a condition that ensures personnel safety and plant integrity

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ELEMENT	PERFORMANCE CRITERIA
3 Complete documentation	3.1 Documentation is updated and plant problems, movements, abnormalities and status are reported and logged in accordance with enterprise/site procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of conducting chemical batching operations.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO245B Chemical batching operations

Evidence shall show that knowledge has been acquired for safe working practices of:

T1 Relevant Environmental, Occupational Health and Safety legislation and regulations

T2 Enterprise procedures

T3 Plant drawings and manufacturers manuals

T4 Introduction to and typical arrangements of power production plant

T5 Relevant plant and equipment, its location and operating parameters

T6 Electric motor types and characteristics

T7 Pump and compressor types and characteristics

T8 Valve, damper and actuator types and characteristics

T9 Switchgear types and characteristics

T10 Electrical protection types and characteristics

T11 Water chemistry

T12 Plant status

T13 Enterprise recording procedures

T14 Relevant chemicals, uses and hazards

T15 Properties of matter

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REQUIRED SKILLS AND KNOWLEDGE

T16 Lubrication and bearings

KS02-PO245B Chemical batching operations

Specific skills needed to achieve the Performance Criteria:

T1 Interpret plant drawings and manufacturers manuals

T2 Apply enterprise recording procedures

T3 Identify plant status

T4 Prepare plant/equipment for operation

T5 Organise resources

T6 Apply diagnostic and testing techniques

T7 Plan and prioritise work

T8 Use relevant hand tools

T9 Communicate effectively

T10 Conduct chemical batching operation.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of the competency standard unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the

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competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each Element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
    - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control

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measures as specified in the Performance Criteria and Range Statement
- Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
- Demonstrate an understanding of the Essential Knowledge and Associated Skills as described in 6) Essential Knowledge and Associated Skills of this unit
- Demonstrate an appropriate level of employability skills
- Conduct work observing the relevant Anti-Discrimination legislation, regulations, polices and workplace procedures

- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Knowledge and application of relevant sections of: Occupational, health and safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Knowledge of the types of chemicals, properties and precautions taken
  - Conducting chemical batching operations
  - Knowledge of and ability to safely handle hazardous materials
  - Dealing with an unplanned event by drawing on Essential Knowledge and Skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this competency standard unit

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of

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work.

In addition to the resources listed above in Context of assessment', evidence should show competency working in, in limited spaces, with different types of plant and equipment as well as different structural/construction types and method and in a variety of environments.

Method of assessment

9.4)

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this competency standard unit applies. This requires that the specified Essential Knowledge and Associated Skills be assessed in a structured environment, which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the Essential Knowledge and Skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

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RANGE STATEMENT

Chemicals may include ammonia, sulphuric acid, caustic soda, hydrochloric acid, biocides, corrosion inhibitors and aluminium polyelectrolytes.

Safety standards may include relevant sections of Occupational Health and Safety legislation and enterprise safety rules.

Information and documentation sources may include verbal and written communications, enterprise/site safety rules documentation/form(s), equipment and alarm manuals, dedicated computer equipment, enterprise/site operating instructions, enterprise/site log book, manufacturer's operation and maintenance manuals, enterprise standing instructions and plant notes and material safety data sheets.

Technical and operational indicators may include stimuli (audio, smell, touch, visual), remote or local indicators and recorders and alarms (visible and or audible).

Communications may be by means of telephone, two way radio, pager, operating log (written or verbal), computers (electronic mail) and public address system.

Appropriate personnel to consult, give or receive direction may include supervisor/team leader or equivalent, technical and engineering officers or equivalent, power plant operations personnel or equivalent.

Operating environment may be remote from plant and equipment being operated (operation is assisted by remote indicators of plant status and other parameter monitors), during inclement or otherwise harsh weather conditions, in wet/noisy/dusty/hot areas or during continuous operation.

Equipment used may include personal safety equipment, flexible barrier equipment, portable pumps valving and associated pipe work.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations

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UEPOPS246B Operate waste and contaminated water plant

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to operate, inspect and monitor waste contaminated water plant associated with a power generating complex.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

Pre-Requisites

Prerequisite Unit(s) **4)**

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Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 2 Writing 2 Numeracy 2

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Plan and prepare work	1.1	Safety issues are identified to comply with enterprise/site requirements
	1.2	Work requirements are identified from relevant personnel and documentation
	1.3	Documentation to determine plant status is assessed and evaluated
	1.4	Localised plant inspection and field preparation for service are carried out in accordance with manufacturer's and enterprise procedures
	1.5	Plant operational pre-requisites are established in accordance with manufacturer's and enterprise procedures
	1.6	Sequence for recommissioning of plant is determined to suit existing circumstances in accordance with enterprise/site requirements
	1.7	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2 Operate plant	2.1	Plant is operated in accordance with enterprise and manufacturer's operating procedures
	2.2	Plant is monitored and observed to detect deviations from normal operating conditions
	2.3	Corrective actions taken to rectify abnormalities in accordance with manufacturer's and enterprise procedures
	2.4	Plant is removed from service in accordance with enterprise/site requirements
	2.5	Corrective actions are taken in accordance with enterprise safety rules and site requirements when abnormalities are identified during the removal from service

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ELEMENT	PERFORMANCE CRITERIA
3 Test plant operation	3.1 Tests are performed in accordance with defined procedures applicable to the operational test
	3.2 Plant is observed for correct operational response
	3.3 Corrective action is taken when response is not in accordance with documentation, plant integrity or personnel safety requirements
	3.4 Plant is returned to required operational status upon completion of test
4 Analyse plant faults	4.1 Causes of abnormal plant operating conditions are identified by analysing the technical and operational information in a logical and sequential manner
	4.2 Corrective action taken is in accordance with enterprise/site procedures
	4.3 Plant integrity and personnel safety is maintained through consultation with appropriate personnel, and reference to plant, technical and operational documentation
5 Monitor and inspect plant	5.1 Plant to be monitored/inspected is physically identified
	5.2 Plant is monitored/inspected for normal operation or to detect deviations
	5.3 Corrective action taken is in accordance with enterprise/site procedures
	5.4 Appropriate personnel are notified when defects are detected.
6 Complete documentation	6.1 Documentation is updated and plant problems, movements, abnormalities and status are reported and logged in accordance with enterprise/site procedures

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of operating waste and contaminated water plants.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO246B Waste and contaminated water plant

Evidence shall show that knowledge has been acquired for safe working practices of:

T1 Relevant Environmental, Occupational Health and Safety legislation and regulations

T2 Enterprise procedures

T3 Plant drawings and manufacturers manuals

T4 Introduction to and typical arrangements of power production plant

T5 Relevant plant and equipment, its location and operating parameters

T6 Electric motor types and characteristics

T7 Pump and compressor types and characteristics

T8 Valve, damper and actuator types and characteristics

T9 Switchgear types and characteristics

T10 Electrical protection types and characteristics

T11 Plant status

T12 Control and data acquisition systems

T13 Raw sewage treatment systems types and characteristics

T14 Oil/water separators types and characteristics

T15 Waste water treatment processes

T16 Lubrication and bearings

T17 Electrical principles

KS02-PO246B Waste and contaminated water plant

Specific skills needed to achieve the Performance Criteria:

T1 Interpret plant drawings and manufacturers manuals

T2 Identify plant status

T3 Prepare plant/equipment for operation

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REQUIRED SKILLS AND KNOWLEDGE

T4 Organise resources

T5 Operate waste and contaminated water plant

T6 Apply diagnostic and testing techniques

T7 Identify and respond to abnormal plant operating conditions

T8 Plan and prioritise work

T9 Use relevant hand tools

T10 Communicate effectively

T11 Apply data analysis techniques and tools

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of the competency standard unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place,

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access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each Element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the Essential Knowledge and Associated Skills as described in 6) Essential Knowledge and Associated Skills of this unit

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- Demonstrate an appropriate level of employability skills
- Conduct work observing the relevant Anti-Discrimination legislation, regulations, polices and workplace procedures

- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Knowledge and application of relevant sections of: Occupational, health and safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Preparation and planning of work
  - Operation of waste contaminated water plant
  - Operationally testing plant
  - Analysing plant faults
  - Monitoring plant operation
  - Knowledge of hygiene requirements
  - Dealing with an unplanned event by drawing on Essential Knowledge and Skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this competency standard unit

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and method and in a variety of

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environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines .

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this competency standard unit applies. This requires that the specified Essential Knowledge and Associated Skills be assessed in a structured environment, which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the Essential Knowledge and Skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

For optimisation of training and assessment effort, competence in this unit may be assessed concurrently with the unit(s) as stated in Section 3.1 as well as the following units:

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Systems, plant and/or equipment may include electrical supply switchboard(s) and transformers; oil water separators; pumps; clarifiers, evaporative ponds; pasveer aeration system; electrical motors; valves and actuators, dampers (electric, hydraulic, pneumatic and manual); and supervisory, alarm, protection and control equipment.

Safety standards may include relevant sections of Occupational Health and Safety legislation, enterprise safety rules, relevant state and federal legislation, national

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RANGE STATEMENT

standards for plant and Australian standards.

Information and documentation sources may include verbal or written communications; enterprise safety rules documentation/form(s); equipment and alarm manuals; dedicated computer equipment; enterprise/site operating instructions; enterprise log books; manufacturer's operation and maintenance manuals; and enterprise standing instructions and plant notes.

Technical and operational indicators may include stimuli (audio, smell, touch, visual), remote or local indicators and recorders and alarms (visible and or audible).

Communications may be by means of telephone, two way radio, pager, computer (electronic mail) and operating logs (written or verbal).

Tests may include stand-by plant "cut-in" tests.

Appropriate personnel to consult, give or receive direction may include supervisor/team leader or equivalent, technical and engineering officers or equivalent, maintenance staff, power plant operations or equivalent, contractor staff and other operating staff or equivalent.

Test, fault finding and operating tools may include high voltage testers, proving dead equipment and power or hand tools.

Operating environment may be remote from plant, aided by indicators and monitors, during inclement or otherwise harsh weather conditions, in wet/noisy/dusty/hot areas, during night periods or during continuous operation.

Faults and abnormal operating conditions may include motor/pump/ actuator/valve/ damper failure/malfunctions, control equipment failure/ malfunctions, loss of electrical supply to plant and equipment and excessive vibration pumps/motors.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations

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UEPOPS247B Operate and monitor an internal combustion single fuel reciprocating engine

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to operate, inspect and monitor single fuel internal combustion engines.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 2 Writing 2 Numeracy 2

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the

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Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Plan and prepare work	1.1	Safety issues are identified to comply with enterprise/site requirements
	1.2	Work requirements are identified from relevant personnel and documentation
	1.3	Documentation to determine plant status is assessed and evaluated
	1.4	Localised plant inspection and field preparation for service are carried out in accordance with manufacturer's and enterprise/site procedures
	1.5	Plant operational pre-requisites are established in accordance with manufacturer's and enterprise/site procedures
	1.6	Sequence for recommissioning of plant is determined to suit existing circumstances in accordance with enterprise/site requirements
	1.7	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2 Operate plant	2.1	Plant is operated in accordance with enterprise and manufacturer's operating procedures
	2.2	Plant is monitored and observed to detect deviations from normal operating conditions
	2.3	Corrective actions are taken to rectify abnormalities in accordance with manufacturer's and enterprise/site procedures
3 Test plant operation	3.1	Tests are performed in accordance with defined procedures applicable to the operational test
	3.2	Plant is observed for correct operational response

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ELEMENT		PERFORMANCE CRITERIA	
		3.3	Correct action is taken when response is not in accordance with documentation, plant integrity or personnel safety requirements
		3.4	Appropriate personnel is notified when defects are detected
4	Analyse plant faults	4.1	Causes of abnormal plant operating conditions are identified by analysing the technical and operational information in a logical and sequential manner
		4.2	Corrective action taken is in accordance with enterprise /site procedures
		4.3	Plant integrity and personnel safety is maintained through consultation with appropriate personnel, and reference to plant, technical and operational documentation
5	Monitor and inspect plant	5.1	Plant to be monitored/inspected is physically identified
		5.2	Plant is monitored/inspected for normal operation or to detect deviations
		5.3	Corrective action taken is in accordance with enterprise procedures
		5.4	Appropriate personnel are notified when defects are detected
6	Complete documentation	6.1	Documentation is updated and plant problems, movements, abnormalities and status are reported and logged in accordance with enterprise/site procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of operating and monitoring an

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REQUIRED SKILLS AND KNOWLEDGE

internal combustion single fuel reciprocating engine.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO247B An internal combustion single fuel reciprocating engine

Evidence shall show that knowledge has been acquired for safe working practices of:

T1 Relevant Environmental, Occupational Health and Safety legislation and regulations

T2 Enterprise procedures

T3 Plant drawings and manufacturers manuals

T4 Relevant plant and equipment, its location and operating parameters

T5 Switchgear types and characteristics

T6 Air intake and exhaust system, types and characteristics

T7 Plant status

T8 Enterprise recording procedures

T9 Control and data acquisition systems

T10 Starting system, types and characteristics

T11 Fuel system, types and characteristics

T12 Lubricating system, types and characteristics

T13 Cooling system types and characteristics

T14 Internal combustion reciprocating engine, types and characteristics

KS02-PO247B An internal combustion single fuel reciprocating engine

Specific skills needed to achieve the Performance Criteria:

T1 Interpret plant drawings and manufacturers manuals

T2 Apply enterprise recording procedures

T3 Identify plant status

T4 Prepare plant/equipment for operation

T5 Organise resources

T6 Operate single fuel engines

T7 Apply diagnostic and testing techniques

T8 Identify and respond to abnormal plant operating conditions

T9 Plan and prioritise work

T10 Use relevant hand tools

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REQUIRED SKILLS AND KNOWLEDGE

T11Communicate effectively

T12 Apply data analysis techniques and tools.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of the competency standard unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

9.1)

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature to minimise error in judgment.

Activities associated with normal every day work have a bearing

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on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each Element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the Essential Knowledge and Associated Skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti-Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Knowledge and application of relevant sections of: Occupational, health and safety legislation; Statutory legislation; Enterprise/site safety procedures;

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Enterprise/site emergency procedures

- Preparation and planning of work
- Operation of single fuel engines
- Operationally testing plant
- Analysing plant faults
- Monitoring plant operation
- Knowledge of engine types, starting systems and the fuel system
- Dealing with an unplanned event by drawing on Essential Knowledge and Skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this competency standard unit

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and method and in a variety of environments.

Method of assessment

9.4)

This unit shall be assessed by methods given in Section 1.3.00

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Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this competency standard unit applies. This requires that the specified Essential Knowledge and Associated Skills be assessed in a structured environment, which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the Essential Knowledge and Skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Systems, plant and/or equipment may include medium and high speed diesel engines; spark ignition gas engines and associated auxiliaries; electrical supply switchboard(s) and transformers; fans and pumps; valves, actuators and dampers (electric, hydraulic, pneumatic and manual); supervisory, alarm, protection and control equipment; starting systems; and fuel systems

Safety standards may include relevant sections of Occupational Health and Safety legislation, enterprise safety rules, relevant state and federal legislation and national standards for plant

Information and documentation sources may include verbal or written communications; enterprise safety rules documentation; dedicated computer equipment; enterprise/site standing and operating instructions; enterprise log books; manufacturer’s operation and maintenance manuals; and equipment and alarm

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RANGE STATEMENT

manuals

Technical and operational indicators may include stimuli (audio, smell, touch, visual), local indicators and recorders, computers and alarms (visible and or audible).

Communications may be by means of telephone, two way radio, pager, public address system, computer (electronic mail) and operating log (written or verbal).

Tests may include stand-by plant tests, post maintenance operating tests and black start

Appropriate personnel to consult, give or receive direction may include supervisor/team leader or equivalent, technical and engineering officers or equivalent, power system control personnel or equivalent, contractor and specialist personnel, maintenance staff and power plant operations personnel.

Test, fault finding and operating tools may include high voltage testers, proving dead equipment, power or hand tools and control system equipment.

Operating environment may be during inclement or otherwise harsh weather conditions, in wet/noisy/dusty/hot areas or during night periods.

Faults and abnormal operating conditions may include motor/pump/ actuator/valve/dampers failure/malfunctions, control equipment failure/ malfunctions, loss of electrical supply to plant and equipment, high engine/turbocharger/lubricating oil temperatures, low lubricating oil pressure/flow and excessive vibration pumps/motors.

Medium speed diesels may have speeds below 500rpm but are engines of conventional design. The auxiliary equipment is generally remote from plant with separate energy supplies. These engines are medium to large in size and usually require platforms to conduct service and inspection. The monitoring points are at individual sections or components.

High speed diesel engines may have speeds as low as 1000rpm. These engines are of conventional design and are small and compact. The auxiliary equipment is generally integrated with, and powered by, the engine. The monitoring points are usually collective and not at individual sections or components.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

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Competency Field

Competency Field **11)**

Operations

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UEPOPS248B Operate and monitor an internal combustion dual fuel reciprocating engine

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to operate, inspect and monitor dual fuel reciprocating engines.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 2 Writing 2 Numeracy 2

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the

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Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Plan and prepare work	1.1	Safety issues are identified to comply with enterprise/site requirements
	1.2	Work requirements are identified from relevant personnel and documentation
	1.3	Documentation to determine plant status is assessed and evaluated
	1.4	Localised plant inspection and field preparation for service are carried out in accordance with manufacturer's and enterprise/site procedures
	1.5	Plant operational pre-requisites are established in accordance with manufacturer's and enterprise/site procedures
	1.6	Sequence for recommissioning of plant is determined to suit existing circumstances in accordance with enterprise/site requirements
	1.7	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2 Operate plant	2.1	Plant is operated in accordance with enterprise and manufacturer's operating procedures
	2.2	Plant is monitored and observed to detect deviations from normal operating conditions
	2.3	Corrective actions are taken to rectify abnormalities in accordance with manufacturer's and enterprise/site procedures
3 Change fuel type during operation	3.1	Changeover is monitored and observed to detect deviations from expected results
	3.2	Corrective actions are taken to rectify abnormalities in accordance with manufacturer's

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ELEMENT		PERFORMANCE CRITERIA	
			and enterprise/ site requirements.
4	Test plant operation	4.1	Tests are performed in accordance with defined procedures applicable to the operational test
		4.2	Plant is observed for correct operational response
		4.3	Correct action is taken when response is not in accordance with documentation, plant integrity or personnel safety requirements
		4.4	Appropriate personnel are notified when defects are detected
5	Analyse plant faults	5.1	Cause of abnormal plant operating conditions are identified by analysing the technical and operational information in a logical and sequential manner
		5.2	Corrective action taken is in accordance with company procedures
		5.3	Plant integrity and personnel safety is maintained through consultation with appropriate personnel, and reference to plant, technical and operational documentation
6	Monitor and inspect plant	6.1	Plant to be monitored/inspected is physically identified
		6.2	Plant is monitored/inspected for normal operation or to detect deviations
		6.3	Corrective action taken is in accordance with enterprise procedures
		6.4	Appropriate personnel are notified when defects are detected
7	Complete documentation	7.1	Documentation is updated and plant problems, movements, abnormalities and status are reported and logged in accordance with enterprise/site procedures

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of operating and monitoring an internal combustion dual fuel reciprocating engine.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO248B An internal combustion dual fuel reciprocating engine

Evidence shall show that knowledge has been acquired for safe working practices of:

T1 Relevant Environmental, Occupational Health and Safety legislation and regulations

T2 Enterprise procedures

T3 Plant drawings and manufacturers manuals

T4 Introduction to and typical arrangements of power production plant

T5 Relevant plant and equipment, its location and operating parameters

T6 Switchgear types and characteristics

T7 Electrical protection types and characteristics

T8 Plant status;

T9 Starting system, types and characteristics

T10 Fuel systems, types and characteristics

T11 Lubricating system, types and characteristics

T12 Cooling system types and characteristics

T13 Internal combustion reciprocating engine, types and characteristics

T14 Enterprise recording procedures

T15 Control and data acquisition systems

T16 Equipment starting pre-requisites

T17 Fuel changeover equipment types and characteristics

T18 Air intake and exhaust system, types and characteristics

KS02-PO248B An internal combustion dual fuel reciprocating engine

Specific skills needed to achieve the Performance Criteria:

T1 Interpret plant drawings and manufacturers manuals

T2 Apply relevant state and territory regulations

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REQUIRED SKILLS AND KNOWLEDGE

T3 Identify plant status

T4 Prepare plant/equipment for operation

T5 Organise resources

T6 Operate duel fuel engines

T7 Apply diagnostic and testing techniques

T8 Identify and respond to abnormal plant operating conditions

T9 Plan and prioritise work

T10 Use relevant hand tools

T11 Communicate effectively

T12 Apply data analysis techniques and tools

T13 Apply knowledge of dual fuel engine operation.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of the competency standard unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord

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with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each Element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as

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specified in the Performance Criteria and Range Statement
    - Demonstrate an understanding of the Essential Knowledge and Associated Skills as described in 6) Essential Knowledge and Associated Skills of this unit
    - Demonstrate an appropriate level of employability skills
    - Conduct work observing the relevant Anti-Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
    - Knowledge and application of relevant sections of: Occupational, health and safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
    - Preparation and planning of work
    - Operation of duel fuel engines
    - Operationally testing plant
    - Analysing plant faults
    - Monitoring plant operation
    - Knowledge of fuel changeover equipment/systems and requirements
    - Dealing with an unplanned event by drawing on Essential Knowledge and Skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this competency standard unit

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of

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work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and method and in a variety of environments.

Method of assessment

9.4)

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines .

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this competency standard unit applies. This requires that the specified Essential Knowledge and Associated Skills be assessed in a structured environment, which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the Essential Knowledge and Skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

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RANGE STATEMENT

Systems, plant and/or equipment may include dual fuel engines and associated auxiliaries; electrical supply switchboard(s) and transformers; fans and pumps; valves, actuators and dampers (electric, hydraulic, pneumatic and manual); supervisory, alarm, protection and control equipment; starting systems; fuel and fuel changeover systems.

Safety standards may include relevant sections of Occupational Health and Safety legislation, enterprise safety rules, relevant state and federal legislation and national standards for plant Information and documentation sources may include verbal or written communications; enterprise safety rules documentation; dedicated computer equipment; enterprise/site standing and operating instructions; enterprise log books; manufacturer's operation and maintenance manuals; and equipment and alarm manuals

Technical and operational indicators may include stimuli (audio, smell, touch, visual), local indicators and recorders, computers and alarms (visible and or audible).

Communications may be by means of telephone, two way radio, pager, public address system, computer (electronic mail) and operating log (written or verbal).

Tests may include stand-by plant tests, post maintenance operating tests and black start

Appropriate personnel to consult, give or receive direction may include supervisor/team leader or equivalent, technical and engineering officers or equivalent, power system control personnel or equivalent, contractor and specialist personnel, maintenance staff and power plant operations personnel.

Test, fault finding and operating tools may include high voltage testers, proving dead equipment, power or hand tools and control system equipment

Operating environment may be, during inclement or otherwise harsh weather conditions, wet/noisy/dusty/hot areas or during night periods.

Faults and abnormal operating conditions may include motor/pump/ actuator/valve/ dampers failure/malfunctions, control equipment failure/ malfunctions, loss of electrical supply to plant and equipment, high engine/turbocharger/lubricating oil temperatures, low lubricating oil pressure/flow and excessive vibration pumps/motors.

Medium speed diesels may have speeds below 500rpm but are engines of conventional design. The auxiliary equipment is generally remote from plant with separate energy supplies. These engines are medium to large in size and usually require platforms to conduct service and inspection. The monitoring points are at individual sections or components.

High speed diesel engines may have speeds as low as 1000rpm. These engines are of conventional design and are small and compact. The auxiliary equipment is generally integrated with, and powered by the engine. The monitoring points are usually collective and not at individual sections or components.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information

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RANGE STATEMENT

and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations

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UEPOPS249B Liaise with stakeholders

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to communicate with staff and external/internal stakeholders.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

Pre-Requisites

Prerequisite Unit(s) **4)**

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Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 2 Writing 2 Numeracy 2

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare for communication	1.1 Communication requirement is identified, from previous communication or current circumstances, and confirmed
	1.2 The appropriate tone for communication is determined from analysis of previous communication or current circumstances
	1.3 The appropriate medium for communication is determined from analysis of available options, previous communication or current circumstances and used in accordance with enterprise guidelines, manufacturer's and/or site requirements
	1.4 Information is provided according to urgency and importance
	1.5 Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2 Communicate in writing	2.1 Written communication is structured to provide or request information in accordance with site requirements
	2.2 Appropriate format is identified, from analysis of available options and current circumstances, in accordance with site requirements
	2.3 Communication is presented logically, concisely and legibly to satisfy job requirements
	2.4 Information dissemination is adhered to in accordance with enterprise policy
	2.5 Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
3 Communicate orally	3.1 Oral communication is structured to provide or request information in accordance with site

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ELEMENT		PERFORMANCE CRITERIA	
			requirements
		3.2	Communication is conveyed logically, concisely and articulately in a manner appropriate to the situation to satisfy job requirements
		3.3	Effectiveness of communication, including understanding of the intent and content, is confirmed between the parties in accordance with site requirements
		3.4	Information dissemination is adhered to in accordance with enterprise policy
4	Use communications systems	4.1	Communications system is used in accordance with enterprise guidelines, manufacturer's and/or site requirements
5	Complete documentation	5.1	Documentation is updated, maintained and equipment problems, movements, abnormalities and status are reported and logged in accordance with enterprise/site procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of liaising with stakeholders.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO249B Liaise with stakeholders

Evidence shall show that knowledge has been acquired for safe working practices of:

T1 Relevant Environmental, Occupational Health and Safety legislation and regulations

T2 Enterprise procedures

T3 Plant status

T4 Identifying stake holder requirements

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REQUIRED SKILLS AND KNOWLEDGE

T5 Two way radio capabilities, uses and procedures

T6 Electronic mediums procedures

T7 Enterprise documentation system

KS02-PO249B Liaise with stakeholders

Specific skills needed to achieve the Performance Criteria:

T1 Communicate effectively

T2 Use appropriate communication mediums

T3 Adapt the form of communication to anticipated contexts and audiences.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of the competency standard unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place,

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access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each Element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the Essential Knowledge and Associated Skills as described in 6) Essential Knowledge and Associated Skills of this unit

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- Demonstrate an appropriate level of employability skills
- Conduct work observing the relevant Anti-Discrimination legislation, regulations, polices and workplace procedures

- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Knowledge and application of relevant sections of: Occupational, health and safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Communicating and identifying key stake holders
  - Communicating effectively in writing and/or orally
  - Using communication systems
  - Dealing with an unplanned event by drawing on Essential Knowledge and Skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this competency standard unit

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and method and in a variety of environments.

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Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this competency standard unit applies. This requires that the specified Essential Knowledge and Associated Skills be assessed in a structured environment, which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the Essential Knowledge and Skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Key stake holders may include controllers/coordinators, oncoming shift change, support staff, asset centres, patrolmen, customers, clients, other enterprise departments, co-generation staff, other government bodies, line crews, security staff, contractors, field operators, supervisor/team leader or equivalent, power plant operations personnel or equivalent, technical and engineering officers or equivalent, maintenance staff, other operating staff or equivalent, system controller/network controller, field operator and restricted HV operators.

Information and documentation sources may include verbal or written communications; enterprise safety rules documentation; enterprise operating

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RANGE STATEMENT

instructions; dedicated computer equipment; enterprise/site standing and operating instructions; enterprise log books; manufacturer's operation and maintenance manuals; and equipment and alarm manuals.

Medium for communications may include facsimile, pager, telephone, radio, memo, letter, report form, log book, switchboard, e-mail, intercom, CB, posters, personal contact, signals and body language.

Policies may include operating procedures, land rights, operating conditions, codes of practice, availability roster, fuel supply policy, information security and asset security contractor arrangements.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations

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UEPOPS251A Conduct routine wind turbine maintenance

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to conduct a range of routine maintenance functions associated with wind turbines.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

Pre-Requisites

Prerequisite Unit(s) **4)**

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Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no prerequisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 2 Writing 2 Numeracy 2

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and prepare for the work	1.1 Work requirements are identified from request/work orders or equivalent and clarified/confirmed with appropriate parties or by site inspection
	1.2 Occupational Health and Safety standards, statutory requirements, relevant Australian standards, codes of practice, manufacturers' specifications, environmental requirements and enterprise procedures are identified, applied and monitored throughout the work procedure
	1.3 Resources required to satisfy the work plan are identified, obtained and inspected for compliance with the job specifications
	1.4 Relevant plans, drawings and texts are selected and interpreted in accordance with the work plan
	1.5 Correct size, type and quantity of materials/components are determined, obtained and inspected for compliance with the job specifications
	1.6 Work is planned in detail including sequencing and prioritising and considerations made, where appropriate, for the maintenance of plant security and capacity in accordance with system/site requirements
	1.7 Co-ordination requirements, including requests for isolations where appropriate, are resolved with others involved, affected or required by the work
	1.8 Potential hazards are identified and prevention and/or control measures are selected in accordance with the work plan and site procedures
	1.9 Work area is prepared in accordance with work requirements and site procedures
2 Conduct routine	2.1 Required isolations are confirmed where

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ELEMENT	PERFORMANCE CRITERIA	
maintenance		appropriate in accordance with enterprise requirements
	2.2	Routine maintenance is conducted in accordance with the work plan and site requirements
	2.3	Minor adjustments are undertaken in accordance with prescribed procedures and schedules and site requirements
	2.4	Faults are reported to the relevant parties in accordance with site/enterprise procedures
3 Complete the work	3.1	Work is completed and appropriate personnel notified in accordance with site/enterprise requirements
	3.2	Work area is cleared of waste, cleaned, restored and secured in accordance with site/enterprise procedures
	3.3	Plant, tools and equipment are maintained and stored in accordance with site/enterprise procedures
	3.4	Work completion details are finalised in accordance with site/enterprise procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of conducting routine wind turbine maintenance.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO251A Routine wind turbine maintenance

Evidence shall show that knowledge has been acquired for safe working practices of:

T1 Relevant Environmental, Occupational Health and Safety legislation and regulations

T2 Enterprise procedures

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REQUIRED SKILLS AND KNOWLEDGE

T3 Plant drawings and manufacturers manuals

T4 Introduction to and typical arrangements of wind farm power plant

T5 Relevant plant and equipment, its location and operating parameters

T6 Equipment and material required to perform the work

T7 Wind farm principles

T8 Wind turbine types and characteristics

T9 Routine maintenance techniques

T10 Hand and portable power tools

T11 Lubrication systems and oil conditioning systems

T12 Lifting techniques

T13 Working at heights principles

T14 Cleaning techniques

T15 Ladder safety

T16 Fitness requirements for climbing towers

KS02-PO251A Routine wind turbine maintenance

Specific skills needed to achieve the Performance Criteria:,

T1 Interpret plant drawings and manufacturers manuals

T2 Apply routine maintenance techniques

T3 Identify and select materials for the job

T4 Use hand and portable power tools

T5 Store and maintain tools and equipment

T6 Apply working at principles

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of the competency standard unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

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Overview of Assessment **9.1)**

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit **9.2)**

Before the critical aspects of evidence are considered all

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prerequisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each Element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the Essential Knowledge and Associated Skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skillsConduct work observing the relevant Anti-Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Knowledge and application of relevant sections of: Occupational, health and safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Acquiring and analysing information relevant for recording
  - Maintaining records
  - Retrieving records
  - Dealing with an unplanned event by drawing on Essential Knowledge and Skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a

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workplace. This should include:

- OHS policy and work procedures and instructions
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this competency standard unit

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working in confined spaces, with different types of plant and equipment as well as different structural/construction types and method and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this competency standard unit applies. This requires that the specified Essential Knowledge and Associated Skills be assessed in a structured environment, which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the Essential Knowledge and Skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

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Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Routine maintenance may include lubrication, gland nipping, draining of water taps, filter cleaning and changing, greasing, filling of oil tanks, removing/replacing access covers, applying plastic metals, cleaning plant and equipment, degreasing, limited mechanical assembly, minor fabrication e.g. brackets, gaskets, changing globes and starters, switchboard indicator lenses, checking transformer oil levels, generator brush changes , changing of oil and air filters, cleaning of air and oil filters, battery inspection, recording of cell voltages.

Inspections should be planned with the appropriate parties to determine access, conditions and work requirements.

Materials may refer to lubricants, chemical, cleaning agents and emery paper.

Equipment may include pitch and yaw controls, pumps, fans, compressors, blowers, transmissions, pipe work, heat exchangers, tanks, printers, , recorders, battery cells, , generator brushes, air conditioners, transformers, switchboards and control panels.

Tools may include grease guns, hand tools, power tools and specialist tools.

Appropriate parties may refer to supervisor, tradesperson or operations personnel.

Work completion details and plans may include plant and maintenance records, job cards, check sheets, on device labelling updates and reporting and/or documenting equipment defects.

Work site environment may be affected by nearby plant or processes, e.g. chemical, heat, dust, noise, gas and oil.

Isolations can refer to electrical/mechanical or other associated processes.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

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Competency Field

Competency Field **11)**

Operations

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UEPOPS252A Undertake local systems operations

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to operate plant at the local position, in conjunction with co-ordinated systems under the control of appropriate authorised personnel.

Application of the Unit

Application of the Unit **2)**

This unit describes competencies applicable to employees working under the supervision of the authorised person in charge of the coordinated system

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 2 Writing 2 Numeracy 2

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the

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Evidence Guide.

Elements and Performance Criteria

ELEMENT		PERFORMANCE CRITERIA	
1	Plan and prepare work	1.1	Safety issues are identified to comply with enterprise/site requirements
		1.2	Work requirements are identified from relevant personnel and documentation
		1.3	Plant status is identified and confirmed in accordance with enterprise/site requirements and instructions
		1.4	Pre-operational checks are carried out on plant according to enterprise/site requirements and instructions
2	Operate plant	2.1	System component/s to be locally controlled identified and operated in accordance with site/ enterprise operating procedures and instructions
		2.2	Plant is operated within limits of plant design, enterprise or site requirements
		2.3	Plant is monitored and observed to detect deviations from normal operating conditions
3	Complete documentation	3.1	Documentation is updated and plant problems, movements, abnormalities and status are reported and logged in accordance with enterprise/site procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence must show that knowledge has been acquired of safe working practices and assembling electronic apparatus.

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REQUIRED SKILLS AND KNOWLEDGE

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

KS01-PO252A Operate Electrical Generation Plant Equipment Locally

Evidence shall show an understanding of how to operate electrical generation plant equipment locally to an extent indicated by the following aspects:

T1 Instruction sheets, including:

- Enterprise-specific work instructions or job sheets
- Manufacturers' operating instructions and manuals
- Plant drawings and flow charts

T2 Principles of plant equipment associated with fuel-burning electricity generation plants, including:

- burner tilts
- burner operations
- precipitator plant
- ash or dust plant
- hydrogen/seal oil differential pressure controllers
- stator temperature controller
- hydrogen temperature controller
- ammonia dosing controller
- feed heater level controls
- secondary air and flue gas dampers
- turning gear barring equipment
- rotary air heater barring equipment
- sootblowing retracting equipment
- reflux valve controls
- condenser level controls
- condenser backflushing equipment
- oil temperature controllers
- turbine gland sealing controllers
- electricity distribution system (AC and DC)
- valves, actuators and dampers (electric, hydraulic, pneumatic and manual)

i. Types of valves including:

  - Gate, butterfly and ball valves.
  - Control valves.
  - Safety valves.

- Basic pumps

T3 Principles of plant equipment associated with gas-turbine electricity generating plants.

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REQUIRED SKILLS AND KNOWLEDGE

T4 Principles of plant equipment associated with hydro-electricity generating plants.

T5 Principles of plant equipment associated with solar-electricity generating plants.

T6 Fault testing and identification, including:

- Stand-by plant tests
- Post-maintenance operating tests
- Test running equipment

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of the competency standard unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical

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equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each Element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the Essential Knowledge and Associated Skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of

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contexts from the prescribed items below:

- Knowledge and application of relevant sections of: Occupational, health and safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
- Preparation and planning of work
- Local operation of plant/equipment
- Dealing with an unplanned event by drawing on Essential Knowledge and Skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this competency standard unit

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working in confined spaces, with different types of plant and equipment as well as different structural/construction types and method and in a variety of environments.

Method of assessment

9.4)

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

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Competent performance with inherent safe working practices is expected in the Industry to which this competency standard unit applies. This requires that the specified Essential Knowledge and Associated Skills be assessed in a structured environment, which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the Essential Knowledge and Skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Plant and equipment may include burner tilts; burner operations; precipitator plant; ash or dust plant; hydrogen/seal oil differential pressure controllers; stator temperature controller; hydrogen temperature controller; ammonia dosing controller; feed heater level controls; secondary air and flue gas dampers; turning gear barring equipment; rotary air heater barring equipment; sootblowing retracting equipment; reflux valve controls; condenser level controls; condenser backflushing equipment; oil temperature controllers; turbine gland sealing controllers; electricity distribution system a.c. and d.c.; valves, actuators and dampers (electric, hydraulic, pneumatic and manual); supervisory, alarm and control equipment.

Safety standards may include relevant sections of Occupational Health and Safety legislation, enterprise safety rules, relevant state and federal legislation and national standards for plant.

Information and documentation sources may include verbal or written communications; enterprise safety rules documentation; enterprise operating instructions; dedicated computer equipment; enterprise/site standing and operating

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RANGE STATEMENT

instructions; enterprise log books; manufacturer's operation and maintenance manuals; and equipment and alarm manuals.

Technical and operational indicators may include stimuli (audio, smell, touch, visual), remote or local indicators and recorders, computers and alarms (visible and or audible).

Communications may be by means of telephone, two way radio, pager, computers (electronic mail) and operating log (written or verbal).

Tests may include stand-by plant tests and post maintenance operating tests.

Appropriate personnel to consult, give or receive direction may include supervisor/team leader or equivalent, power plant operator/unit controller or equivalent; technical and engineering officers or equivalent; maintenance staff; other operating staff or equivalent.

Test, fault finding and operating tools may include high voltage testers, proving dead equipment, power or hand tools, control system equipment and specialised testing equipment.

Operating environment may be remote from plant and equipment being operated (operation is assisted by remote indicators of plant status and other parameter monitors), during inclement or otherwise harsh weather conditions, in wet/noisy/dusty/hot areas or during continuous operation.

Unit operations may include spurious faults in automatic systems; automatic systems operating out of range; failure of automatic system component(s); and routine plant movement.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations

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UEPOPS301B Conduct single energy source isolation procedures for permit to work

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to apply single energy source isolation procedures of the permit to work procedures at the isolating level.

Job requirements including permits are co-ordinated with other personnel involved in, or affected by, the isolation in accordance with enterprise/site requirements.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
UEENEEE101A	Apply Occupational Health and Safety regulations, codes and practices in the workplace

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

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Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT		PERFORMANCE CRITERIA	
1	Plan and prepare for isolation, de-isolation and restoration	1.1	Work requirements are identified from request/work orders or equivalent and clarified/confirmed with the appropriate parties or by site inspection
		1.2	Safety issues are identified to comply with statutory, enterprise and site requirements
		1.3	Materials, equipment and resources required to satisfy the job plan are identified, requisitioned, obtained and inspected for compliance with job specifications
		1.4	Work is planned in detail with the responsible issuing officer, including sequencing and prioritising of work, and the maintenance of plant security and capacity in accordance with permit/site requirements
		1.5	Job requirements including permits are co-ordinated with other personnel involved in, or affected by, the isolation in accordance with enterprise/site requirements
		1.6	Where appropriate the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of on-the-job training
2	Perform isolation	2.1	Plant to be isolated is correctly identified
		2.2	Isolation is performed in accordance with enterprise/site permit to work procedures
		2.3	Verify the effectiveness of the isolation, dissipation and restraint of energy sources in

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ELEMENT	PERFORMANCE CRITERIA	
		accordance with enterprise/site procedures
	2.4	Isolations are confirmed with others involved in, or affected by, the work in accordance with enterprise/site procedures
3 Perform de-isolation and restoration	3.1	De-isolation and restoration of plant is performed in accordance with permit to work procedures
	3.2	De-isolations are confirmed with others involved in, or affected by, the work in accordance with enterprise/site procedures
	3.3	Work completion details are finalised in accordance with enterprise/site procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence must show that knowledge has been acquired of safe working practices and conduct single energy source isolation procedures.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

KS01-PO301B Conduct Single Energy Source Isolation Procedures for Permit to Work

Evidence shall show an understanding of how to isolate a single energy source as required before a Permit-to-Work can be issued, to an extent indicated by the following aspects:

T1 Knowledge of the local enterprise-based –'Permit to Work' (PTW) system.

T2 Interpret plant and equipment diagrams.

- Electrical schematic diagrams
- Piping and Instrument Drawings

T3 Properties of matter and energy

- Phases of matter
- Units of measurement:
  - volume,

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REQUIRED SKILLS AND KNOWLEDGE

  - density,
  - specific gravity.
- Pressure:
  - measurement of pressure,
  - negative pressure
  - head pressure
  - density of water.
- Energy:
  - Laws of Thermodynamics
  - Mechanical/kinetic energy
  - Electrical energy
  - Chemical energy
  - Solar energy
  - Potential energy
- Temperature scales.
- Latent heat
- Enthalpy.

T4 Valves actuators:

- Pneumatic
- Hydraulic
- Electrical

T5 Mechanical isolations, de-isolations and restorations

- Fuel-fired generator
- Hydro generator
- Wind generator
- Solar generator

T6 DC Electrical Fundamentals

- Atomic structure.
- Ohm law.
- Calculating series and circuits.
- Calculating parallel circuits.
- Calculating power.

T7 AC Electrical Principles

- Magnetism.
- Electromagnetism.
- Generating AC electricity.
- AC capacitance.

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REQUIRED SKILLS AND KNOWLEDGE

- AC Inductance.
- AC phaser diagrams.
- Introduction to electric motors

T8 LV switching

- Knowledge of LV protection;
- Types of LV switchgear.

T9 Lock-and-tag systems

- Types of lock out devices and systems
- Placement of electrical isolations
- Removal of stored energy from electrical isolation systems
- Placement of mechanical isolations
- Removal of stored energy from mechanical isolation systems

T10 Switching sequence instructions

- Interpret and apply switching sequence instructions;
- Confirmation of correct sequencing before commencing work.

T11 Completion of documentation

- Enterprise-based record keeping procedures.

T12 Emergency Procedures

- Declaration of emergency procedure;
- Fire suppression procedure and implementation;
- Emergency generator equipment shutdown procedure.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

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Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with

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the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

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Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment

9.4)

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note: Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

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RANGE STATEMENT

Other personnel involved may include issuing officer, isolating officers, recipient in charge and testing officer or their equivalent.

Communications may be by means of telephone, two way radio, pager, public address system, computer and operating log (written or verbal)

Safety standards may include relevant sections of enterprise safety rules, relevant state and federal legislation and national standards for plants

Permits may include any documentation/forms approved for use by the enterprise safety rules and permit to work procedures.

Work completion details may include log books, computer input.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations.

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UEPOPS304B Make and spread a stockpile

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to make and spread stockpiles.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit may require a licence to practise in the workplace in some States or Territories. There may also be additional assessment activities required by regulatory authorities for the issue of the licence to practise.

Practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
UEENEEE101A	Apply Occupational Health and Safety regulations, codes and practices in the workplace

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

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Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Plan and prepare work	1.1	Safety issues are identified to comply with enterprise/site requirements
	1.2	Machine requirements identified and verified from job specifications
	1.3	Quality assurance requirements recognised and adhered to
	1.4	Locations of services identified from plans and drawings (water, power, telephone)
	1.5	Features (such as structures, designated parking areas, haul roads and unstable ground) are identified from site drawings
	1.6	Services located on site verified and marked
	1.7	Work schedule devised consistent with job requirements
	1.8	Pre-operational checks are carried out on plant according to manufacturer recommendations and site requirements
	1.9	Materials to be stockpiled identified from drawings and specifications
	1.10	Prepare pad to receive coal for stockpiling, removal of contamination, drainage
	1.11	Warning devices put in place prior to the commencement of stockpiling coal

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ELEMENT	PERFORMANCE CRITERIA	
2 Make stockpiles	2.1	Start up, park up, shut down procedures carried out in accordance with manufacturer and or site specific requirements
	2.2	Machine and attachments are adjusted for varied weather and ground conditions
	2.3	Safe grip and productivity maintained in varied conditions
	2.4	Control levers used to produce smooth movement of attachments in a safe manner as described in manufacturer manual
	2.5	Machine is monitored and observed to detect deviations from required operating conditions and faults acted upon are reported in accordance with site instructions/requirements
	2.6	Emergency procedures are carried out in accordance with manufacturer and/or site requirements
	2.7	Traffic flow and work area conditions are monitored and anticipated to facilitate safe operations
	2.8	Inspection and fault finding are carried out in accordance with manufacturer and/or site requirements
	2.9	Slope and height formed to job specifications and industry tolerances
	2.10	Coal is packed tightly to prevent air ingress to prevent fires and weather channelling from rain water
3 Spread piles	3.1	Soil/rock/coal is safely removed from stockpiles
	3.2	Site standard practices, including housekeeping, are carried out and reviewed, where necessary, to prevent contamination
4 Monitor and control contamination	4.1	Visual inspections and sampling results are monitored and reported to maintain specifications

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ELEMENT	PERFORMANCE CRITERIA	
	4.2	Site standard practices, including housekeeping are carried out and reviewed where necessary to prevent contamination.
5 Complete documentation	5.1	Post operational check and minor maintenance is carried out on machine and/or accessories in accordance with manufacturer recommendations and site requirements
	5.2	Documentation is updated and plant problems, movements, abnormalities and status are reported and logged in accordance with enterprise/site procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of making and spreading a stockpile

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO304B Make and spread a stockpile

Evidence shall show that knowledge has been acquired for safe working practices of:

T1 Relevant Environmental, Occupational Health and Safety legislation and regulations

T2 Relevant plant and equipment, its location and operation

T3 Technical drawings and manufacturers manuals

T4 Enterprise procedures

T5 Operational and maintenance procedures

T6 Equipment characteristics, technical capabilities and limitations

T7 Basic geological and survey data

T8 Attachments, their capabilities and limitations

T9 Excavation and levelling techniques

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REQUIRED SKILLS AND KNOWLEDGE

T10 Vehicle recording systems

T11 Warning and directional signals

T12 Pre start, start up and shut down procedures

T13 Enterprise recording procedures

T14 Coal storing principles and techniques

T15 Safe operating principles

KS02-PO304B Make and spread a stockpile

Specific skills needed to achieve the Performance Criteria:

T1 Apply relevant Occupational Health and Safety regulations

T2 Apply relevant statutory legislation

T3 Apply relevant enterprise procedures

T4 Organise resources where applicable

T5 Operate and maintain machinery and accessories

T6 Use hand tools

T7 Respond to emergencies

T8 Apply pre start, start up and shut down procedures

T9 Communicate effectively

T10 Inspect and diagnose machines and attachments

T11 Shift and transfer materials

T12 Apply data analysis techniques and tools

T13 Stockpile coal

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

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Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit **9.2)**

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered

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holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Equipment capabilities and limitations
  - Minor maintenance procedures
  - Attaching/detaching required accessories and/or attachments
  - Preparation and planning of work
  - Operating and manoeuvring machines and attachments
  - Shifting and transferring materials
  - Making a stockpile
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment **9.3)**

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This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment

9.4)

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines..

Note: Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

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Range Statement

RANGE STATEMENT

10) This relates to the unit of competency as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Plant and equipment may include: bulldozers, mobile earthmoving equipment and coal handling plant

Safety standards may include: relevant sections of Occupational Health and Safety legislation; enterprise safety rules; relevant state and federal legislation; national standards for plant

Site hazards may include: power lines; trees; overhead service lines; surrounding buildings; other equipment; earthworks; obstructions; underground services; bridges; facilities; dangerous material; fires within coal pile (creating holes unseen) and slippery conditions when wet

Information and documentation sources may include: verbal and written communications; enterprise/site safety rules documentation/form(s); equipment and alarm manuals; dedicated computer equipment; standing enterprise/site and operating instructions; enterprise/site log book and manufacturer operation and maintenance manuals

Technical and operational indicators may include: stimuli (audio, smell, touch, visual); local indicators and recorders; computers and alarms (visible and or audible)

Communications may be by means of: telephone, two way radio; pager; public address system; facsimile; computer (electronic mail); operating log; written or verbal whistle; hand signals; sirens; beacons; barriers; signs and notices

Tests may include: alarm and protection tests and performance tests

Appropriate personnel for consultation or giving or receiving direction may include: supervisor/team leader or equivalent; technical and engineering officers or equivalent; contractor staff; other production staff and maintenance staff

Test, fault finding and operating tools may include: hand and power tools

Operating environment may be: during inclement or otherwise harsh weather conditions, in wet/noisy/dusty/hot areas or during night periods

Faults and abnormal operating conditions may include: loss of hydraulic oil pressure; loss of motor oil pressure; electrical breakdowns; loss of cooling water; loss of tyre pressure and loss of track

Minor maintenance may include: fuel checks; water checks; oil checks; greasing; cleaning; tyre or track inspections and minor adjustments

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The

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RANGE STATEMENT

definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations.

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UEPOPS305B Operate and monitor briquette coal cooling plant

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required for operations associated with the cooling of coal in the briquette manufacturing process.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships.

Pre-Requisites

Prerequisite Unit(s) **4)**

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Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
UEENEEE101A	Apply Occupational Health and Safety regulations, codes and practices in the workplace

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

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Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT		PERFORMANCE CRITERIA	
1	Plan and prepare plant for operation	1.1	Safety issues are identified to comply with enterprise/site and legislative requirements
		1.2	Work, plant and resource requirements are identified from relevant personnel, information and documentation
		1.3	Quality assurance requirements are identified in accordance with enterprise/site requirements
		1.4	Documentation to determine plant status is assessed and evaluated
		1.5	Localised plant inspection and field preparation for service is carried out in accordance with manufacturer and enterprise/site procedures
		1.6	Plant operational pre-requisites are established in accordance with manufacturer and enterprise/site procedures
		1.7	Sequence and plant requirements for operation of plant is determined to suit existing circumstances in accordance with enterprise/site requirements
		1.8	The teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
		1.9	Log and reporting requirements are carried out in accordance with site procedures
2	Operate and monitor	2.1	Plant is operated and shut down in accordance with enterprise and manufacturer operating

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ELEMENT		PERFORMANCE CRITERIA	
	coal cooling plant		procedures
		2.2	Plant is monitored and observed to detect deviations from normal operating conditions
		2.3	Product quality is regularly monitored
		2.4	Corrective actions taken to rectify abnormalities, are in accordance with industry standards and site requirements
3	Test plant operation	3.1	Tests are performed in accordance with defined procedures
		3.2	Correct action is taken when response is not in accordance with documentation, plant integrity or personnel safety requirements
		3.3	Plant is returned to required operational status upon completion of test
4	Identify plant faults	4.1	Causes of abnormal plant operating conditions are identified by referring to technical and operational information in a logical and sequential manner
		4.2	Corrective action taken is in accordance with enterprise/site procedures
		4.3	Plant integrity and personnel safety is maintained through consultation with appropriate personnel, and with reference to plant, technical and operational documentation
5	Monitor and inspect plant	5.1	Plant to be monitored/inspected is physically identified
		5.2	Plant is monitored/inspected for normal operation or to detect deviations
		5.3	Corrective action taken is in accordance with enterprise/site procedures
		5.4	Supervisor and other appropriate personnel are notified when defects are detected
6	Complete documentation	6.1	Documentation is updated and plant problems, movements, and abnormalities and status are

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ELEMENT	PERFORMANCE CRITERIA
	reported and logged in accordance with enterprise/site procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of operating and monitoring briquette coal cooling plants.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO305B Briquette coal cooling plant

Evidence shall show that knowledge has been acquired for safe working practices of:

T1 Relevant Environmental, Occupational Health and Safety legislation and regulations

T2 Enterprise procedures

T3 Plant drawings and manufacturers manuals

T4 Introduction to and typical arrangements of power production plant

T5 Relevant plant and equipment, its location and operating parameters

T6 Electric motor types and characteristics

T7 Pump and compressor types and characteristics

T8 Valve, damper and actuator types and characteristics

T9 Switchgear types and characteristics

T10 Electrical protection types and characteristics

T11 Relevant state and territory regulations

T12 Plant status

T13 Enterprise recording procedures

T14Fire suppression, explosion and fire alert procedures

T15 Disaster and emergency response plans

T16 Coal drying methods and relationship between cooling house operations and other functions

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REQUIRED SKILLS AND KNOWLEDGE

T17 Control and monitoring systems

T18 Lubrication and bearings

T19 Potential hazards and control measures

T20 Safe operating principles

KS02-PO305B Briquette coal cooling plant

Specific skills needed to achieve the Performance Criteria:

T1 Interpret plant drawings and manufacturers manuals

T2 Apply enterprise recording procedures

T3 Identify plant status

T4 Prepare plant/equipment for operation

T5 Operate briquetting cooling house plant and equipment

T6 Fire fighting

T7 Work at heights

T8 Hazard recognition, assessment and control

T9 Apply enterprise testing techniques

T10 Identify and report abnormal plant operating conditions

T11 Plan and prioritise work

T12 Use relevant hand tools

T13 Communicate effectively

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

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Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with

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the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement OH&S workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Preparation and planning of work
  - Start up and shut down procedures
  - Maintaining plant in service
  - Operationally testing plant
  - Assessing plant and production conditions
  - Maintaining coal flow appropriate to operating conditions
  - Detection and reporting of plant faults
  - Monitoring plant operation
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a

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workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment

9.4)

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note: Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

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Range Statement

RANGE STATEMENT

10) This relates to the unit of competency as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Systems, plant and/or equipment may include the number of briquetting presses, steam, water and press oil systems, the number of coal driers and louvres operating, coal types, operating condition of plant, weather conditions, humidity level, bearings, electrical motors, valves, conveyors, motors, hydraulic systems, pumps, storage bunkers and associated equipment, trippers, valves and actuators (electric, hydraulic and pneumatic), lubricating and oil conditioning systems, fire services system, dust suppression system, alarms, protection and control equipment.

Safety standards may include relevant sections of Occupational Health and Safety legislation, enterprise safety rules, relevant state and federal legislation and national standards for plant.

Information and documentation sources may include verbal or written communications; enterprise safety rules documentation/forms; equipment and alarm manuals; dedicated computer equipment; enterprise/site standing and operating instructions; enterprise/site log books; equipment manufacturer operation and maintenance manuals.

Technical and operational indicators may include stimuli (audio, smell, touch, visual), remote or local indicators and recorders, computers and alarms (visible and or audible).

Communications may be by means of telephone, two way radio, pager, public address system, computer and operating log (written or verbal).

Tests may include alarm and protection tests, performance tests, stand-by plant tests and post maintenance operating tests.

Appropriate personnel to consult, give or receive direction may include supervisor/team leader or equivalent, technical and engineering officers or equivalent, maintenance staff, contractor personnel, other production staff and plant operators.

Test, fault finding and operating tools may include hand tools and basic testing equipment.

Operating environment may be during inclement or otherwise harsh weather conditions, in wet/noisy/dusty/hot areas or during night periods.

Faults and abnormal operating conditions may include motor/pump/ actuator/valve failure/malfunctions, control equipment failure/malfunctions, loss of electrical supply to plant and equipment, loss of conveyor(s)/restricted availability, loss or contamination of or restricted availability due to variances in quality raw brown coal or operating conditions.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information

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RANGE STATEMENT

and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations.

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UEPOPS306B Operate and monitor briquette coal drying plant

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required for operations associated with the drying of coal in the briquette manufacturing process.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships.

Pre-Requisites

Prerequisite Unit(s) **4)**

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Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
UEENEEE101A	Apply Occupational Health and Safety regulations, codes and practices in the workplace

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

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Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT		PERFORMANCE CRITERIA	
1	Plan and prepare plant for operation	1.1	Safety issues are identified to comply with enterprise/site and legislative requirements
		1.2	Work, plant and resource requirements are identified from relevant personnel, information and documentation
		1.3	Quality assurance requirements are identified in accordance with enterprise/site requirements
		1.4	Documentation to determine plant status is assessed and evaluated
		1.5	Localised plant inspection and field preparation for service is carried out in accordance with manufacturer and enterprise/site procedures
		1.6	Plant operational pre-requisites are established in accordance with manufacturer and enterprise/site procedures
		1.7	Sequence and plant requirements for operation of plant is determined to suit existing circumstances in accordance with enterprise/site requirements
		1.8	The teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
		1.9	Log and reporting requirements are carried out in accordance with site procedures
2	Operate coal drying	2.1	Plant is operated and shut down in accordance with enterprise and manufacturer operating

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ELEMENT		PERFORMANCE CRITERIA	
	plant		procedures
		2.2	Plant is monitored and observed to detect deviations from normal operating conditions
		2.3	Product quality is regularly monitored
		2.4	Corrective actions taken to rectify abnormalities are in accordance with industry standards and site requirements
3	Test plant operation	3.1	Tests are performed in accordance with defined procedures
		3.2	Correct action is taken when response is not in accordance with documentation, plant integrity or personnel safety requirements
		3.3	Plant is returned to required operational status upon completion of test
4	Identify plant faults	4.1	Causes of abnormal plant operating conditions are identified by referring to technical and operational information in a logical and sequential manner
		4.2	Corrective action taken is in accordance with enterprise/site procedures
		4.3.	Plant integrity and personnel safety is maintained through consultation with appropriate personnel, and with reference to plant, technical and operational documentation
5	Monitor and inspect plant	5.1	Plant to be monitored/inspected is physically identified
		5.2	Plant is monitored/inspected for normal operation or to detect deviations
		5.3	Corrective action taken is in accordance with enterprise/site procedures
		5.4	Supervisor and other appropriate personnel are notified when defects are detected
6	Complete documentation	6.1	Documentation is updated and plant problems, movements, and abnormalities and status are

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ELEMENT	PERFORMANCE CRITERIA
	reported and logged in accordance with enterprise/site procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of operating and monitoring briquette coal drying.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO306B Briquette coal drying plant

Evidence shall show that knowledge has been acquired for safe working practices of:

T1 Relevant Environmental, Occupational Health and Safety legislation and regulations

T2 Enterprise procedures

T3 Plant drawings and manufacturers manuals

T4 Introduction to and typical arrangements of power production plant

T5 Relevant plant and equipment, its location and operating parameters

T6 Electric motor types and characteristics

T7 Pump and compressor types and characteristics

T8 Valve, damper and actuator types and characteristics

T9 Switchgear types and characteristics

T10 Electrical protection types and characteristics

T11 Plant status

T12 Enterprise recording procedures

T13 Fire suppression, explosion and fire alert procedures

T14 Coal drying methods and relationship between drier operations and other functions

T15 Control and monitoring systems

T16 Lubrication and bearings

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REQUIRED SKILLS AND KNOWLEDGE

T17 Potential hazards and control measures

T18 Disaster and emergency response plans

KS02-PO306B Briquette coal drying plant

Specific skills needed to achieve the Performance Criteria:

T1 Interpret plant drawings and manufacturers manuals

T2 Apply enterprise recording procedures

T3 Identify plant status

T4 Prepare plant/equipment for operation

T5 Operate briquetting coal drying plant

T6 Hazard recognition, assessment and control

T7 Apply enterprise testing techniques

T8 Identify and report abnormal plant operating conditions

T9 Plan and prioritise work

T10 Use relevant hand tools

T11 Communicate effectively

T12 Apply basic recording techniques using standard operating procedures.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment	**9.1)**
	Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment

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intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline,

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work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:

- Implement OH&S workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
- Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
- Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
- Demonstrate an appropriate level of employability skills
- Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures

- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Knowledge and application of relevant sections of: OH&S legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Preparation and planning of work
  - Start up and shut down procedures
  - Maintaining plant in service
  - Operationally testing plant
  - Assessing plant and production conditions
  - Maintaining coal and steam flow at appropriate moisture level
  - Process steam temperature and pressure monitoring
  - Detection and reporting of plant faults
  - Monitoring plant operation
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.

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- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

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Range Statement

RANGE STATEMENT

10) This relates to the unit of competency as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Systems, plant and or equipment may include the number of briquetting driers and briquette presses operating, steam, water and oil systems, pressure equipment, coal types, moisture levels, bearings, electrical motors, valves, conveyors, motors, hydraulic systems, pumps, bunkers and associated equipment, feeders, trippers, valves and actuators (electric, hydraulic and pneumatic), lubricating and oil conditioning systems, fire services system, dust suppression system, alarms, protection and control equipment.

Safety standards may include relevant sections of Occupational Health and Safety legislation, enterprise safety rules, relevant state and federal legislation and national standards for plant.

Information and documentation sources may include verbal or written communications; enterprise safety rules documentation/forms; equipment and alarm manuals; dedicated computer equipment; enterprise/site standing and operating instructions; enterprise/site log books; equipment manufacturer operation and maintenance manuals.

Technical and operational indicators may include stimuli (audio, smell, touch, visual), remote or local indicators and recorders, computers and alarms (visible and or audible).

Communications may be by means of telephone, two way radio, pager, public address system, computer and operating log (written or verbal).

Tests may include alarm and protection tests, performance tests, stand-by plant tests and post maintenance operating tests.

Appropriate personnel to consult, give or receive direction may include supervisor/team leader or equivalent, technical and engineering officers or equivalent, maintenance staff, contractor personnel, other production staff and plant operators.

Test, fault finding and operating tools may include hand tools and basic testing equipment

Operating environment may be during inclement or otherwise harsh weather conditions, in wet/noisy/dusty/hot areas or during night periods.

Faults and abnormal operating conditions may include motor/pump/ actuator/valve/ failure/malfunctions, control equipment failure/ malfunctions, loss of electrical supply to plant and equipment, loss of conveyor(s)/restricted availability, loss or contamination of or restricted availability due to variances in quality raw brown coal or operating conditions.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information

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RANGE STATEMENT

and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations.

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UEPOPS307B Operate and monitor briquette coal press plant

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required for operations associated with the pressing of dried raw fine coal into briquettes.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships.

Pre-Requisites

Prerequisite Unit(s) **4)**

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Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
UEENEEE101A	Apply Occupational Health and Safety regulations, codes and practices in the workplace

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

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Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT		PERFORMANCE CRITERIA	
1	Plan and prepare plant for operation	1.1	Safety issues are identified to comply with enterprise/site and legislative requirements
		1.2	Work, plant and resource requirements are identified from relevant personnel, information and documentation
		1.3	Quality assurance requirements are identified in accordance with enterprise/site requirements
		1.4	Documentation to determine plant status is assessed and evaluated
		1.5	Localised plant inspection and field preparation for service is carried out in accordance with manufacturer and enterprise/site procedures
		1.6	Plant operational pre-requisites are established in accordance with manufacturer and enterprise/site procedures
		1.7	Sequence for recommissioning of plant is determined to suit existing circumstances in accordance with enterprise/site requirements
		1.8	The teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
		1.9	Log and reporting requirements are carried out in accordance with site procedures
2	Operate and shut down coal briquette	2.1	Plant is operated and shut down in accordance with enterprise and manufacturer operating

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ELEMENT		PERFORMANCE CRITERIA	
	press		procedures
		2.2	Plant is monitored and observed to detect deviations from normal operating conditions
		2.3	Product quality is regularly monitored
		2.4	Corrective actions taken to rectify abnormalities, are in accordance with industry standards and site requirements
3	Test plant operation	3.1	Tests are performed in accordance with defined procedures
		3.2	Corrective action is taken when response is not in accordance with documentation, plant integrity or personnel safety requirements
		3.3	Plant is returned to required operational status upon completion of test
4	Identify plant faults	4.1	Causes of abnormal plant operating conditions are identified by referring to technical and operational information in a logical and sequential manner
		4.2	Corrective action taken is in accordance with enterprise/site procedures
		4.3	Plant integrity and personnel safety is maintained through consultation with appropriate personnel, and with reference to plant, technical and operational documentation
5	Monitor and inspect plant	5.1	Plant to be monitored/inspected is physically identified
		5.2	Plant is monitored/inspected for normal operation or to detect deviations
		5.3	Corrective action taken is in accordance with enterprise/site procedures
		5.4	Supervisor and other appropriate personnel are notified when defects are detected
6	Complete documentation	6.1	Documentation is updated and plant problems, movements, and abnormalities and status are

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ELEMENT	PERFORMANCE CRITERIA
	reported and logged in accordance with enterprise/site procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of operating and monitoring briquette coal press.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO307B Briquette coal press plant

Evidence shall show that knowledge has been acquired for safe working practices of:

T1 Relevant Environmental, Occupational Health and Safety legislation and regulations

T2 Enterprise procedures

T3 Plant drawings and manufacturers manuals

T4 Introduction to and typical arrangements of power production plant

T5 Relevant plant and equipment, its location and operating parameters

T6 Electric motor types and characteristics

T7 Pump and compressor types and characteristics

T8 Valve, damper and actuator types and characteristics

T9 Switchgear types and characteristics

T10 Electrical protection types and characteristics

T11 Plant status

T12 Enterprise recording procedures

T13 Fire suppression, explosion and fire alert procedures

T14 Disaster and emergency response plans

T15 Briquette production methods and relationship between press operations, process laboratory and other functions

T16 Hydraulic power units

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REQUIRED SKILLS AND KNOWLEDGE

T17 Communication principles

T18 Control and monitoring systems

T19 Lubrication and bearings

T20 Potential hazards and control measures

T21 Safe operating principles

KS02-PO307B Briquette coal press plant

Specific skills needed to achieve the Performance Criteria:

T1 Interpret plant drawings and manufacturers manuals

T2 Apply enterprise recording procedures

T3 Identify plant status

T4 Prepare plant/equipment for operation

T5 Organise resources where applicable

T6 Operate coal press plant

T7 Fire fighting

T8 Work at heights

T9 Apply enterprise testing techniques

T10 Identify and report abnormal plant operating conditions

T11 Plan and prioritise work

T12 Use relevant hand tools

T13 Communicate effectively;

T14 Apply basic recording techniques using standard operating procedures

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

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Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit **9.2)**

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered

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holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Preparation and planning of work
  - Start up and shut down procedures
  - Maintaining plant in service
  - Operationally testing plant
  - Maintaining product quality
  - Detection and reporting of plant faults
  - Monitoring plant operation
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items

Context of and specific resources for assessment **9.3)**

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This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

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Nil

Range Statement

RANGE STATEMENT

10) This relates to the unit of competency as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Systems, plant and or equipment may include coal feeder boxes, mills, presses, steam, water and press oil systems, pressure equipment, press stamps and panels, conveyors and launders, press tongue and cutters, press flywheel and backing plates, bearings, electrical motors, valves, conveyors, motors, trippers, valves and actuators (electric, hydraulic and pneumatic), fire services system, dust suppression system, alarms, protection and control equipment.

Safety standards may include relevant sections of Occupational Health and Safety legislation, enterprise safety rules, relevant state and federal legislation and national standards for plant.

Information and documentation sources may include verbal or written communications; enterprise safety rules documentation/forms; equipment and alarm manuals; dedicated computer equipment; enterprise/site standing and operating instructions; enterprise/site log books; equipment manufacturer operation and maintenance manuals.

Technical and operational indicators may include stimuli (audio, smell, touch, visual), remote or local indicators and recorders, computers and alarms (visible and or audible).

Communications may be by means of telephone, two way radio, pager, public address system, computer and operating log (written or verbal).

Tests may include alarm and protection tests, performance tests, stand-by plant tests and post maintenance operating tests.

Appropriate personnel to consult, give or receive direction may include supervisor/team leader or equivalent, technical and engineering officers or equivalent, maintenance staff, contractor personnel, other production staff and plant operators.

Test, fault finding and operating tools may include hand tools and basic testing equipment.

Operating environment may be during inclement or otherwise harsh weather conditions, in wet/noisy/dusty/hot areas or during night periods.

Faults and abnormal operating conditions may include motor/pump/ actuator/valve/ failure/malfunctions, control equipment failure/ malfunctions, loss of electrical supply to plant and equipment, loss of conveyor(s)/restricted availability, loss or contamination of or restricted availability due to variances in quality raw brown coal

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RANGE STATEMENT

or operating conditions.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations.

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UEPOPS308B Perform briquette laboratory tests

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required for activities associated with the testing of coal briquette products.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships.

Pre-Requisites

Prerequisite Unit(s) **4)**

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Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT		PERFORMANCE CRITERIA	
1	Plan and prepare test equipment	1.1	Safety issues are identified to comply with enterprise/site and legislative requirements
		1.2	Work, plant, equipment and resource requirements are identified from relevant personnel, information and documentation
		1.3	Quality assurance requirements are identified in accordance with enterprise/site requirements
		1.4	Documentation to determine plant and product status is assessed and evaluated
		1.5	Localised equipment inspection is carried out in accordance with manufacturer and enterprise/site procedures
		1.6	The teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
		1.7	Log and reporting requirements are carried out in accordance with site procedures
2	Test product quality	2.1	Equipment is operated in accordance with enterprise and manufacturer operating procedures
		2.2	Product is quality tested and compared to specifications to detect deviations from normal manufacturing parameters
3	Interpret product test results	3.1	Causes of abnormal product tests are identified by referring to technical and operational information in a logical and sequential manner
		3.2	Corrective action taken is in accordance with enterprise/site procedures
		3.3	Plant and equipment integrity and personnel safety is maintained through consultation with appropriate personnel, and with reference to plant, technical and operational documentation

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ELEMENT	PERFORMANCE CRITERIA	
	3.4	Supervisor and other appropriate personnel are notified when defects are detected
4 Complete documentation	4.1	Documentation is updated and plant, equipment and product problems, movements, and abnormalities and status are reported and logged in accordance with enterprise/site procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of performing briquette laboratory tests.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO308B Briquette laboratory tests

Evidence shall show that knowledge has been acquired for safe working practices of:

T1 Relevant Environmental, Occupational Health and Safety legislation and regulations

T2 Enterprise procedures

T3 Plant drawings and manufacturers manuals

T4 Introduction to and typical arrangements of power production plant

T5 Relevant plant and equipment, its location and operating parameters

T6 Plant status

T7 Product specifications and requirements

T8 Enterprise recording procedures

T9 Fire suppression, explosion and fire alert procedures

T10 Disaster and emergency response plans

T11 Briquette production methods and relationship between press operations, process laboratory and other functions

T12 Control and monitoring systems

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REQUIRED SKILLS AND KNOWLEDGE

KS02-PO308B Briquette laboratory tests

Specific skills needed to achieve the Performance Criteria:

T1 Interpret plant drawings and manufacturers manuals

T2 Apply enterprise recording procedures

T3 Identify plant status

T4 Prepare plant/equipment for operation

T5 Organise resources where applicable

T6 Operate briquette testing equipment

T7 Hazard recognition, assessment and control

T8 Apply enterprise testing techniques

T9 Identify and report abnormal plant operating conditions

T10 Plan and prioritise work

T11 Use relevant hand tools

T12 Communicate effectively

T13 Apply basic recording techniques using standard operating procedures

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment	**9.1)**
	Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment

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is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:

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- Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
- Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
- Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
- Demonstrate an appropriate level of employability skills
- Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures

- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Preparation and planning of work
  - Product monitoring and testing techniques
  - Operationally testing plant and equipment
  - Maintaining product quality
  - Detection and reporting of plant and equipment faults
  - Monitoring plant and equipment operation
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace

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conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment

9.4)

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the unit of competency as a whole providing the range of contexts

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RANGE STATEMENT

and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Systems, plant and or equipment may include testing equipment, the number of presses operating, coal and briquette quality, plant condition, production systems, steam, water and press oil systems, pressure equipment, press stamps and panels, press cutters, bearings, conveyors and launders, electrical motors, valves, conveyors, motors, hydraulic systems, pumps, storage bunkers and associated equipment, trippers, valves and actuators (electric, hydraulic and pneumatic), lubricating and oil conditioning systems, fire services system, dust suppression system, alarms, protection and control equipment.

Safety standards may include relevant sections of Occupational Health and Safety legislation, enterprise safety rules, relevant state and federal legislation and national standards for plant.

Information and documentation sources may include verbal or written communications; enterprise safety rules documentation/forms; equipment and alarm manuals; dedicated computer equipment; enterprise/site standing and operating instructions; enterprise/site log books; equipment manufacturer operation and maintenance manuals.

Technical and operational indicators may include stimuli (audio, smell, touch, visual), remote or local indicators and recorders, computers and alarms (visible and or audible).

Communications may be by means of telephone, two way radio, pager, public address system, computer and operating log (written or verbal).

Tests may include alarm and protection tests, performance tests, stand-by plant tests and post maintenance operating tests.

Appropriate personnel to consult, give or receive direction may include supervisor/team leader or equivalent, technical and engineering officers or equivalent, maintenance staff, contractor personnel, other production staff and plant operators.

Test, fault finding and operating tools may include hand tools and basic testing equipment.

Operating environment may be during inclement or otherwise harsh weather conditions, in wet/noisy/dusty/hot areas or during night periods.

Faults and abnormal operating conditions may include motor/pump/ actuator/valve/ failure/malfunctions, control equipment failure/ malfunctions, loss of electrical supply to plant and equipment, loss of conveyor(s)/restricted availability, loss or contamination of or restricted availability due to variances in quality raw brown coal or operating conditions.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

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Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations.

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UEPOPS309B Operate and monitor air conditioning plant and ventilation systems

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This competency standard unit deals with the skills and knowledge required to operate and monitor air conditioning plant / ventilation systems, and associated equipment.

Application of the Unit

Application of the Unit **2)**

This competency standard unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit may require an electrical licence to practice in the workplace.

Practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the

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Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and prepare for the work	1.1 Safety issues are identified to comply with enterprise/site and legislative requirements plan and prepare plant for operation
	1.2 Work, plant and resource requirements are identified from relevant personnel, information and documentation
	1.3 Quality assurance requirements are identified in accordance with enterprise/site requirements
	1.4 Documentation to determine plant status is assessed and evaluated
	1.5 Localised plant inspection and field preparation for service is carried out in accordance with manufacturer's and enterprise/site procedures
	1.6 Plant operational pre-requisites are established in accordance with manufacturer's and enterprise/site procedures
	1.7 Sequence and plant requirements for operation of plant is determined to suit existing circumstances in accordance with enterprise/site requirements
	1.8 The teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
	1.9 Log and reporting requirements are carried out in accordance with site procedures
2 Operate and monitor air conditioning equipment and ventilation systems	2.1 Plant is operated and shut down in accordance with enterprise and manufacturer's operating procedures
	2.2 Plant is monitored and observed to detect

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ELEMENT		PERFORMANCE CRITERIA	
			deviations from normal operating conditions
		2.3	Plant's performance quality is regularly monitored, temperature, airflow humidity
		2.4	Corrective actions taken to rectify abnormalities, are in accordance with industry standards and site requirements
3	Test plant operation	3.1	Tests are performed in accordance with defined procedures
		3.2	Correct action is taken when response is not in accordance with documentation, plant integrity or personnel safety requirements Test plant operation
		3.3	Plant is returned to required operational status upon completion of test
4	Identify plant faults	4.1	Causes of abnormal plant operating conditions are identified by referring to technical and operational information in a logical and sequential manner
		4.2	Corrective action taken is in accordance with enterprise/site procedures
		4.3	Plant integrity and personnel safety is maintained through consultation with appropriate personnel, and with reference to plant, technical and operational documentation
5	Monitor and inspect plant	5.1	Plant to be monitored/inspected is physically identified
		5.2	Plant is monitored/inspected for normal operation or to detect deviations
		5.3	Corrective action taken is in accordance with enterprise/site procedures
		5.4	Supervisor and other appropriate personnel are notified when defects are detected
6	Complete documentation	6.1	Documentation is updated and plant problems, movements, and abnormalities and status are reported and logged in accordance with

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ELEMENT	PERFORMANCE CRITERIA
	enterprise/site procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of operating and monitoring air conditioning equipment and ventilation systems.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO309B Air conditioning plant and ventilation systems

Evidence shall show that knowledge has been acquired for safe working practices of:

T1 Relevant Environmental, Occupational Health and Safety legislation and regulations

T2 Enterprise procedures

T3 Plant drawings and manufacturers manuals

T4 Introduction to and typical arrangements of power production plant

T5 Relevant plant and equipment, its location and operating parameters

T6 Electric motor types and characteristics

T7 Pump and compressor types and characteristics

T8 Valve, damper and actuator types and characteristics

T9 Switchgear types and characteristics

T10 Electrical protection types and characteristics

T11 Relevant state and territory regulations

T12 Air conditioner systems types and characteristics

T13 Ventilation systems types and characteristics

T14 Plant status

T15 Enterprise recording procedures

T16 Control, supervisory and data acquisition systems

T17 Emergency procedures

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REQUIRED SKILLS AND KNOWLEDGE

T18 legionella bacteria control procedures

T19 Electrical principlesT20 Refrigerant gases

KS02-PO309B Air conditioning plant and ventilation systems

Specific skills needed to achieve the Performance Criteria:

T1 Interpret plant drawings and manufacturers manuals

T2 Apply legionella bacteria control procedures

T3 Apply enterprise recording procedures

T4 Identify plant status

T5 Prepare plant/equipment for operation

T6 Organise resources

T7 Apply diagnostic and testing techniques

T8 Identify and respond to abnormal plant operating conditions

T9 Operate air conditioning plant

T10 Plan and prioritise work

T11 Use relevant hand tools

T12 Communicate effectively

T13 Apply data analysis techniques and toolsT14 Apply electrical principlesT15 Communicate effectivelyT16 Apply data analysis techniques and tools.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that

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can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

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- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Preparation and planning of work
  - Verification techniques
  - Diagnostic and fault finding techniques and procedures
  - Repair techniques and procedures
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or

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simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

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RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Systems, plant and/or equipment may include electrical supply switchboard(s) and transformers; air conditioner compressors; chillers and associated cooling plant; air fans; humidifiers; heaters and filters; electrical motors; valves, actuators and dampers (electric, hydraulic, pneumatic and manual); supervisory, alarm, protection and control equipment; and chemical dosing equipment.

Safety standards may include relevant sections of Occupational Health and Safety legislation, enterprise safety rules, relevant state and federal legislation, national standards for plant and environmental legislation.

Information and documentation sources may include verbal and written communications, enterprise/site safety rules documentation, enterprise operating instructions, manufacturer's operation and maintenance manuals, equipment and alarm manuals, dedicated computer equipment, enterprise standing instructions and plant notes and enterprise log books.

Technical and operational indicators may include stimuli (audio, smell, touch, visual), local indicators and recorders and alarms (visible and or audible).

Communications may be by means of telephone, two way radio, pager, public address system, facsimile, computer (electronic mail) and operating log (written or verbal).

Tests may include motor direction checks, stand-by plant "cut-in" tests and performance tests.

Appropriate personnel to consult, give or receive direction may include supervisor/team leader or equivalent, power plant operations personnel or equivalent, technical and engineering officers or equivalent, contractor staff and maintenance staff.

Test, fault finding and operating tools may include hand and power tools and proving dead equipment.

Operating environment may be during inclement or otherwise harsh weather conditions, in wet/noisy/dusty/hot areas and during continuous operation.

Faults and abnormal operating conditions may include motor/pump/ actuator/valve/fan failure/malfunctions, control equipment failures/ malfunctions, loss of electrical supply to plant and equipment, excessive vibration pumps/motors, cooling tower abnormal operation, legionella bacteria count high and refrigerant compressor malfunction/failure.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

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Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations.

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UEPOPS310B Operate bulk coal handling plant

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This competency standard unit deals with the skills and knowledge required to address the storage, reclaiming and dispatching of bulk coal. It also encompasses the skills and knowledge required to monitor any associated mobile bulk coal handling plant's operation.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must have been completed.

There are no pre-requisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the

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Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Plan and prepare work	1.1	Safety issues are identified to comply with enterprise/site requirements
	1.2	Work, plant and resource requirements are identified from relevant personnel, information and documentation
	1.3	Quality assurance requirements recognised and adhered to
	1.4	Basic mineralogy information is interpreted and applied in accordance with enterprise/site requirements
	1.5	Work schedule devised consistent with job requirements
	1.6	The pad is prepared to receive coal for stockpiling including removal of contamination and drainage
	1.7	Pre-operational checks are carried out on plant according to manufacturer recommendations and site requirements
	1.8	Sequence for recommissioning of plant is determined to suit existing circumstances in accordance with enterprise/site requirements
	1.9	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2 Operate machine/plant	2.1	Start up, park up and shut down procedures are carried out in accordance with manufacturer and/or site specific requirements
	2.2	Plant is operated in accordance with enterprise and manufacturer operating procedures

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ELEMENT	PERFORMANCE CRITERIA	
	2.3	Plant is monitored and observed to detect deviations from normal operating conditions
	2.4	Corrective actions taken or reported, to rectify abnormalities, are in accordance with industry standards and site requirements
	2.5	Plant to be removed from service is locally identified and isolated in accordance with enterprise/site standards and requirements
	2.6	Corrective actions are taken in accordance with safety rules and site requirements when abnormalities are identified during the removal from service
	2.7	Inspection and fault finding are carried out in accordance with manufacturer and/or site requirements
	2.8	Coal is placed in predetermined stockpile location in accordance with enterprise/site procedures
	2.9	Reclaim specifications are received, personnel dispatch area is notified of the requirement and equipment is made ready to dispatch and reclaim product
	2.10	Specified coal is blended, loaded, sampled and dispatched in accordance with enterprise/site procedures
	2.11	Dispatch details are recorded in accordance with enterprise/site procedures
3 Test plant operation	3.1	Tests are performed in accordance with defined procedures applicable to the operational test
	3.2	System and plant is observed for correct operational response
	3.3	Correct action is taken when response is not in accordance with documentation, plant integrity or personnel safety requirements
	3.4	Plant is returned to required operational status

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ELEMENT		PERFORMANCE CRITERIA	
			upon completion of test
4	Analyse system faults	4.1	Causes of abnormal plant operating conditions are identified by analysing the technical and operational information in a logical and sequential manner
		4.2	Corrective action taken is in accordance with enterprise procedures
		4.3	Plant integrity and personnel safety is maintained through consultation with appropriate personnel, and with reference to plant, technical and operational documentation
		4.4	Appropriate supplementary personnel are arranged for local investigation or identified operational abnormalities
5	Inspect plant	5.1	Plant to be inspected is physically identified
		5.2	Plant is inspected for expected operation or to detect deviations from normal operating conditions of the plant
		5.3	Corrective action taken is in accordance with enterprise/site procedures
		5.4	Appropriate personnel is notified when defects are detected
6	Complete documentation	6.1	Documentation is updated and plant problems, movements, and abnormalities and status are reported and logged in accordance with enterprise/site procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of operating bulk coal handling plants

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REQUIRED SKILLS AND KNOWLEDGE

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO310B Bulk coal handling plant

Evidence shall show that knowledge has been acquired for safe working practices of:

T1 Relevant Environmental, Occupational Health and Safety legislation and regulations

T2 Enterprise procedures

T3 Plant drawings and manufacturers manuals

T4 Introduction to and typical arrangements of power production plant

T5 Relevant plant and equipment, its location and operating parameters

T6 Electric motor types and characteristics

T7 Pump and compressor types and characteristics

T8 Valve, damper and actuator types and characteristics

T9 Switchgear types and characteristics

T10 Electrical protection types and characteristics

T11 Plant status

T12 Enterprise recording procedures

T13 Warning and directional signals

T14 Coal blending procedures

T15 Stockpile stability and management

T16 Hydraulic power units, types and characteristics

T17 Lubrication and oil conditioning systems, types and characteristics

T18 Lubrication and bearings

T19 Bunkering Coal

T20Auxiliary supply systems (coal handling plant)

KS02-PO310B Bulk coal handling plant

Specific skills needed to achieve the Performance Criteria:

T1 Interpret plant drawings and manufacturers manuals

T2 Identify plant status

T3 Prepare plant/equipment for operation

T4 Organise resources

T5 Operate coal handling plant

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REQUIRED SKILLS AND KNOWLEDGE

T6 Apply diagnostic and testing techniques

T7 Identify and respond to abnormal plant operating conditions

T8 Plan and prioritise work

T9 Use relevant hand tools

T10 Communicate effectively

T11 Apply data analysis techniques and tools

T12 Blend coal

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being

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assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti Discrimination

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legislation, regulations, polices and workplace procedures

- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Preparation and planning of work
  - Operation of coal handling plant
  - Operationally testing plant
  - Analysing plant faults
  - Monitoring plant operation
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items

Context of and specific resources for assessment **9.3)**

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of **9.4)**

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assessment

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the unit of competency as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Systems, plant equipment and/or machinery to be operated and monitored may include electrical supply switchboard(s) and transformers, fixed coal handling plant and equipment, mobile coal plant machinery, relocating plant and equipment (stockpile), fire services system, dust suppression system, supervisory, alarm and control equipment

Types of contamination may include coal (outside specifications), wood, steel, brattice, rock and water.

Safety standards may include relevant sections of Occupational Health and Safety legislation, enterprise safety rules, relevant state and federal legislation, national standards for plant.

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RANGE STATEMENT

Site hazards may include power lines, trees, overhead service lines, other equipment; earthworks, obstructions, underground services, bridges, facilities and dangerous materials

Information and documentation sources may include verbal or written communications; enterprise safety rules documentation/form(s); equipment and alarm manuals; dedicated computer equipment; standing enterprise/site and operating instructions; enterprise/site log books; equipment manufacturer operation and maintenance manuals and statutory body license documentation.

Technical and operational indicators may include stimuli (audio, smell, touch, visual), remote or local indicators and recorders and alarms (visible and or audible).

Communications may be by means of telephone, two way radio, pager, public address system, facsimile, computer (electronic mail), operating logs (written or verbal), whistle or hand signals and operating plan.

Tests may include alarm and protection tests, performance tests, stand-by plant tests and post maintenance operating tests.

Appropriate personnel for consultation, and for giving or receiving direction may include supervisor/team leader or equivalent, technical and engineering officers or equivalent, maintenance staff, contractor personnel, other production staff, mine staff (coal suppliers where relevant) and coal handlers.

Test, fault finding and operating tools may include hand tools and basic electronic testing equipment.

Operating environment may be remote from plant and equipment being operated, (operation is assisted by remote indicators of plant status and other parameters monitored), during inclement or otherwise harsh weather conditions, in wet/noisy/dusty areas or during night periods.

Faults and abnormal operating conditions may include motor/pump/actuator/valve/ dampers failure/malfunction, control equipment failure/malfunctions, loss of electrical supply to plant and equipment, loss of conveyors/restricted availability, loss of, or restricted availability of, mobile plant and wet weather operation.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries

Unit Sector(s)

Not applicable.

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Competency Field

Competency Field **11)**

Operations.

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UEPOPS311B Operate fabric filter dust collection plant

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to operate, inspect and monitor fabric filter dust collection plant associated with coal fired power stations.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships.

Pre-Requisites

Prerequisite Unit(s) **4)**

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Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Plan and prepare work	1.1	Safety issues are identified to comply with enterprise/site and legislative requirements
	1.2	Work requirements are identified from relevant personnel and documentation
	1.3	Localised plant inspection, pre-operational checks and field preparations for service are carried out in accordance with manufacturer and enterprise/site procedures
	1.4	Plant operational pre-requisites are established in accordance with manufacturer and enterprise/site procedures
	1.5	Sequence for recommissioning of plant is determined to suit existing circumstances in accordance with enterprise/site requirements
	1.6	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2 Operate plant	2.1	Plant is operated in accordance with enterprise and manufacturer operating procedures
	2.2	Plant is monitored and observed to detect deviations from normal operating conditions
	2.3	Corrective actions taken or reported, to rectify abnormalities, are in accordance with industry standards and site requirements
3 Test plant operation	3.1	Tests are performed in accordance with defined procedures applicable to the operational test
	3.2	Plant is observed for correct operational response
	3.3	Corrective action is taken when response is not in accordance with documentation, plant integrity or personnel safety requirements

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ELEMENT		PERFORMANCE CRITERIA	
		3.4	Plant is returned to required operational status upon completion of test
4	Analyse plant faults	4.1	Causes of abnormal plant operating conditions are identified by analysing the technical and operational information in a logical and sequential manner
		4.2	Corrective action taken is in accordance with enterprise/site procedures
		4.3	Plant integrity and personnel safety is maintained through consultation with appropriate personnel, and with reference to plant, technical and operational documentation
5	Monitor and inspect plant	5.1	Plant to be monitored/inspected is physically identified
		5.2	Plant is monitored/inspected for normal operation or to detect deviations
		5.3	Corrective action taken is in accordance with enterprise/site procedures
		5.4	Appropriate personnel are notified when defects are detected
6	Complete documentation	6.1	Documentation is updated and plant problems, movements and abnormalities and status are reported and logged in accordance with enterprise/site procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of operating fabric filter dust collection plants.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

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REQUIRED SKILLS AND KNOWLEDGE

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO311B Fabric filter dust collection plant

Evidence shall show that knowledge has been acquired for safe working practices of:

T1 Relevant environmental, occupational health and safety legislation and regulations

T2 Enterprise procedures

T3 Plant drawings and manufacturers manuals

T4 Introduction to and typical arrangements of power production plant

T5 Relevant plant and equipment, its location and operating parameters

T6 Relevant state and territory regulations

T7 Electric motor types and characteristics

T8 Pump and compressor types and characteristics

T9 Valve, damper and actuator types and characteristics

T10 Switchgear types and characteristics

T11 Electrical protection types and characteristics

T12 Electrical principles

T13 Fan types and characteristics

T14 Transformers types and characteristics

T15 Plant status

T16 Enterprise recording procedures

T17 Control and data acquisition systems

T18 Valve, damper and actuator types and characteristics

T19 Fabric filter bag toxicity properties and appropriate safety precautions

T20 Properties of matter

T21 Lubrication and bearings

T22 Fabric filters, types and characteristics

T23 Ash and dust removal systems, types and characteristics

T24 Electrical principles

T25 Auxiliary supply systems

T26 Safe operating principles

KS02-PO311B Fabric filter dust collection plant

Specific skills needed to achieve the Performance Criteria:

T1 Interpret plant drawings and manufacturers manualsT2 Apply enterprise recording

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REQUIRED SKILLS AND KNOWLEDGE

proceduresT3 Identify plant status

T4 Prepare plant/equipment for operation

T5 Organise resources

T6 Operate fabric filter plant

T7 Apply diagnostic and testing techniques

T8 Identify and respond to abnormal plant operating conditions

T9 Plan and prioritise work

T10 Use relevant hand tools

T11 Communicate effectively

T12 Apply data analysis techniques and tools

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

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Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement

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- Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
- Demonstrate an appropriate level of employability skills
- Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures

- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Preparation and planning of work
  - Operation of fabric filter dust collection plant
  - Operationally testing plant
  - Analysing plant faults
  - Monitoring plant operation
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of

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environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines..

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the unit of competency as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Systems, plant and/or equipment may include electrical supply switchboard(s) and transformers, fans (simple), electrical motors a.c., valves, dampers and actuators (electric, hydraulic, manual and pneumatic), lubricating and oil conditioning systems, supervisory, protection, alarm and control equipment, dust ejectors, sluice water systems, fabric filter cells and hoppers and air slides.

Safety standards may include relevant sections of Occupational Health and Safety

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RANGE STATEMENT

legislation, enterprise safety rules, relevant state and federal legislation, national standards for plant and Australian standards.

Information and documentation sources may include verbal or written communications; enterprise safety rules documentation; enterprise operating instructions; manufacturer operational and maintenance manuals; equipment and alarm manuals; dedicated computer equipment; standing enterprise instructions and plant notes; and enterprise log books.

Technical and operational indicators may include stimuli (audio, smell, touch, visual), remote or local indicators and recorders and alarms (visible and/or audible).

Communications may be by means of telephone, two way radio, pager, computer (electronic mail), operating logs (written or verbal) and public address system

Tests may include motor direction checks, stand-by plant “cut-in” tests, performance tests and alarm initiation tests

Appropriate personnel to consult, give or receive direction may include supervisor/team leader or equivalent, power plant operations personnel, technical and engineering officers or equivalent, maintenance staff, contractor personnel and other production staff or equivalent.

Test, fault finding and operating tools may include high voltage testers, proving dead equipment, power or hand tools.

Operating environment may be during inclement or otherwise harsh weather conditions, in wet/noisy/dusty/hot areas and during continuous operation.

Faults and abnormal operating conditions may include motor/pump/ actuator/valve/dampers failure/malfunctions, control equipment failure/ malfunctions, loss of electrical supply to plant and equipment, excessive vibration pumps/motors, loss/low ejector water flow, loss/low air slide air pressure, loss of pumps gland sealing water and blocked ejector strainers.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field 11)

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Competency Field **11)**

Operations.

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UEPOPS312B Operate and monitor fuel supply

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to operate, inspect and monitor fuel supply from source to recipient unit storage

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships.

Pre-Requisites

Prerequisite Unit(s) **4)**

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Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Plan and prepare	1.1	Safety issues are identified to comply with enterprise and site requirements
	1.2	Work requirements are identified from relevant personnel and documentation
	1.3	Documentation to determine plant status is assessed and evaluated
	1.4	Localised plant inspection and field preparation for service are carried out in accordance with manufacturer and enterprise procedures
	1.5	Plant operational pre-requisites are established in accordance with manufacturer and enterprise procedures
	1.6	Sequence for recommissioning of plant is determined to suit existing circumstances in accordance with enterprise requirements
	1.7	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2 Operate fuel plant	2.1	Plant is operated in accordance with enterprise/site and manufacturer operating procedures
	2.2	Plant is monitored and observed to detect deviations from normal operating conditions
	2.3	Corrective actions are taken to rectify abnormalities in accordance with manufacturer and enterprise procedures
3 Test plant operation	3.1	Tests are performed in accordance with defined procedures applicable to the operational test
	3.2	Plant is observed for correct operational response
	3.3	Corrective action is taken when response is not

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ELEMENT		PERFORMANCE CRITERIA	
			in accordance with documentation, plant integrity or personnel safety requirements
		3.4	Plant is returned to required operational status upon completion of test
4	Analyse plant faults	4.1	Causes of abnormal plant operating conditions are identified by analysing the technical and operational information in a logical and sequential manner
		4.2	Corrective action taken is in accordance with enterprise procedures
		4.3	Plant integrity and personnel safety are maintained through consultation with appropriate personnel, and with reference to plant, technical and operational documentation
5	Monitor and inspect plant	5.1	Plant to be monitored/inspected is physically identified
		5.2	Plant is monitored/inspected for normal operation or to detect deviations
		5.3	Corrective action taken is in accordance with enterprise procedures
		5.4	Appropriate personnel are notified when defects are detected
6	Complete documentation	6.1	Documentation is updated and plant problems, movements, abnormalities and status are reported and logged in accordance with enterprise/site procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of operating and monitoring fuel supplies.

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REQUIRED SKILLS AND KNOWLEDGE

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO312B Fuel supply

Evidence shall show that knowledge has been acquired for safe working practices of:

T1 Relevant Environmental, Occupational Health and Safety legislation and regulations

T2 Enterprise procedures

T3 Plant drawings and manufacturers manuals

T4 Introduction to and typical arrangements of power production plant

T5 Relevant plant and equipment, its location and operating parameters

T6 Electric motor types and characteristics

T7 Pump and compressor types and characteristics

T8 Valve, damper and actuator types and characteristics

T9 Switchgear types and characteristics

T10 Electrical protection types and characteristics

T11 Electrical fundamentals

T12 Plant status

T13 Enterprise recording procedures

T14 Control and data acquisition systems

T15 Emergency procedures

T16 Fuel leak detection and control

T17 Fuel supply system, types and characteristics

KS02-PO312B Fuel supply

Specific skills needed to achieve the Performance Criteria:

T1 Interpret plant drawings and manufacturers manuals

T2 Identify plant status

T3 Prepare plant/equipment for operation

T4 Organise resources

T5 Operate fuel supply system

T6 Apply diagnostic and testing techniques

T7 Identify and respond to abnormal plant operating conditions

T8 Plan and prioritise work

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REQUIRED SKILLS AND KNOWLEDGE

T9 Use relevant hand tools;

T10 Communicate effectively

T11 Apply data analysis techniques and tools.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

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Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory

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legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures

- Preparation and planning of work
- Operation of fuel supply plant
- Operationally testing plant
- Analysing plant faults
- Monitoring plant operation
- Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment

9.4)

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

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Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the unit of competency as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Systems, plant and/or equipment may include electrical supply switchboard; supervisory, alarm, protection and control equipment; gas supply; gas delivery; fire protection systems; compressors and pumps; electric motors; valves, actuators and dampers (electric, hydraulic, pneumatic and manual); filters and strainers heaters (electrical/steam), oil recirculation systems, attemporators and gas or oil storage systems or biomass systems.

Safety standards may include relevant sections of Occupational Health and Safety legislation, enterprise safety rules, relevant state and federal legislation, national standards for plant and environmental legislation.

Information and documentation sources may include verbal or written communications; enterprise/site safety rules; equipment and alarm manuals; dedicated computer equipment; enterprise/site standing and operating instructions; enterprise/site log books; manufacturer operation and maintenance manuals; and specialist’s reports.

Technical and operational indicators may include stimuli (audio, smell, touch, visual), local indicators and recorders, alarms (visible and or audible) and basic fault finding

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RANGE STATEMENT

equipment.

Communications may be by means of telephone, two way radio, pager public address system, computer (electronic mail) and operating log (written or verbal).

Tests may include stand-by plant tests, post maintenance operating tests and leak testing.

Appropriate personnel to consult, give or receive direction may include supervisor/team leader or equivalent, technical and engineering officers or equivalent, power system control personnel or equivalent, maintenance staff, power plant operations personnel, contractor and specialist personnel.

Test, fault finding and operating tools may include power or hand tools, control system equipment and leak detectors.

Operating environment may be during inclement or otherwise harsh weather conditions, in wet/noisy/dusty/hot areas, during night periods and during continuous operation.

Faults and abnormal operating conditions may include motor/pump/ actuator/valve/damper failure/malfunction; control equipment failure/ malfunctions; loss of electrical supply to plant and equipment; breakdown in delivery of fuel supply; excessive vibration pumps/motors; high filter/strainer differentials; delivery system blockages; fuel supply and delivery system fires; and line fractures/leaks.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations.

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UEPOPS313B Operate and monitor boiler draught system

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to operate, inspect and monitor boiler draught equipment.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships.

Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

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Prerequisite Unit(s) **4)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Plan and prepare work	1.1	Safety issues are identified to comply with enterprise/site and legislative requirements
	1.2	Work requirements are identified from relevant personnel and documentation
	1.3	Documentation to determine plant status is assessed and evaluated
	1.4	Localised plant inspection, pre-operational checks and field preparations for service are carried out in accordance with manufacturer and enterprise/site procedures
	1.5	Plant operational pre-requisites are established in accordance with manufacturer and enterprise/site procedures
	1.6	Sequence for recommissioning of plant is determined to suit existing circumstances in accordance with enterprise/site requirements
	1.7	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2 Operate plant	2.1	Plant is operated in accordance with enterprise and manufacturer operating procedures
	2.2	Plant is monitored and observed to detect deviations from normal operating conditions
	2.3	Corrective actions taken or reported, to rectify abnormalities, are in accordance with industry standards and site requirements
3 Test plant operation	3.1	Tests are performed in accordance with defined procedures applicable to the operational test
	3.2	Plant is observed for correct operational response
	3.3	Corrective action is taken when response is not in accordance with documentation, plant

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ELEMENT		PERFORMANCE CRITERIA	
			integrity or personnel safety requirements
		3.4	Plant is returned to required operational status upon completion of test
4	Analyse plant faults	4.1	Causes of abnormal plant operating conditions are identified by analysing the technical and operational information in a logical and sequential manner
		4.2	Corrective action taken is in accordance with enterprise/site procedures
		4.3	Plant integrity and personnel safety is maintained through consultation with appropriate personnel, and with reference to plant, technical and operational documentation
5	Monitor and inspect plant	5.1	Plant to be monitored/inspected is physically identified
		5.2	Plant is monitored/inspected for normal operation or to detect deviations
		5.3	Corrective action taken is in accordance with enterprise/site procedures
6	Complete documentation	6.1	Documentation is updated and plant problems, movements and abnormalities and status are reported and logged in accordance with enterprise/site procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of operating and monitoring boiler draught systems.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

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REQUIRED SKILLS AND KNOWLEDGE

KS01-PO313B Boiler draught system

Evidence shall show that knowledge has been acquired for safe working practices of:

T1 Relevant Environmental, Occupational Health and Safety legislation and regulations

T2 Enterprise procedures

T3 Plant drawings and manufacturers manuals

T4 Introduction to and typical arrangements of power production plant

T5 Relevant plant and equipment, its location and operating parameters

T6 Electric motor types and characteristics

T7 Pump and compressor types and characteristics

T8 Valve, damper and actuator types and characteristics

T9 Switchgear types and characteristics

T10 Electrical protection types and characteristics

T11 Relevant state and territory regulations

T12 Plant status

T13 Enterprise recording procedures;

T14 Control and data acquisition systems

T15 Properties of matter

T16 Lubrication and bearings

T17 Fans, types and characteristics

T18 Motor variable speed drive types and characteristics

T19 Air flow properties

T20Air heater types and characteristics

T21 Lubrication and bearings

T22 Fly ash and dust extraction systems

T23 Electrical fundamentals

T24 Boiler draft systems, types and characteristics

T25 Principles governing efficient combustion

T26 Electrical principles

KS02-PO313B Boiler draught system

Specific skills needed to achieve the Performance Criteria:

T1 Interpret plant drawings and manufacturers manuals

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REQUIRED SKILLS AND KNOWLEDGE

T2 Apply relevant state and territory regulations

T3 Identify plant status

T4 Prepare plant/equipment for operation

T5 Organise resources

T6 Operate boiler draught plant

T7 Apply diagnostic and testing techniques

T8 Identify and respond to abnormal plant operating conditions Plan and prioritise work

T9 Use relevant hand tools

T10 Communicate effectively

T11 Apply data analysis techniques and tools

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord

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with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

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Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Preparation and planning of work
  - Operation of boiler draught plant
  - Operationally testing plant
  - Analysing plant faults
  - Monitoring plant operation
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items

Context of and specific resources for **9.3)**

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assessment

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of

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learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the unit of competency as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Systems, plant and or equipment may include electrical supply switchboard(s) and transformers, electrical motors, valves, dampers and actuators (electric, hydraulic, manual and pneumatic), lubricating and oil conditioning systems, supervisory, alarm, protection and control equipment, compressors and pumps, fans axial/centrifugal, speed or vane control, filters, strainers and pressure control devices, air heaters, auxiliary steam, emergency drives (air heater), air heater cleaning, washing systems, purge and cooling air systems and control air systems.

Safety standards may include relevant sections of Occupational Health and Safety legislation, enterprise safety rules, relevant state and federal legislation and national standards for plant.

Information and documentation sources may include verbal or written communications; enterprise safety rules documentation; manufacturer operational and maintenance manuals; equipment and alarm manuals; dedicated computer equipment; enterprise standing and operating instructions and enterprise log books.

Technical and operational indicators may include stimuli (audio, smell, touch, visual), local indicators and recorders and alarms (visible and or audible).

Communications may be by means of telephone, two way radio, pager, public address system, computer (electronic mail) and operating log (written or verbal).

Tests may include post maintenance operating tests and stand-by plant tests.

Appropriate personnel to consult, give or receive direction may include, supervisor/team leader or equivalent, technical and engineering officers or equivalent, maintenance staff, contractor personnel, other production staff or equivalent, power system control personnel or equivalent and power plant operations personnel.

Test, fault finding and operating tools may include power or hand tools, control system equipment, H.V. testers and proving dead equipment.

Operating environment may be during inclement or otherwise harsh weather conditions, in wet/noisy/dusty/hot areas, during night periods and during continuous operation.

Faults and abnormal operating conditions may include motor/pumps/actuator/ valve/damper failure/malfunctions, control equipment failure/malfunctions, loss of

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RANGE STATEMENT

electrical supply to plant and equipment, excessive vibration, pumps/motors, air heater drive failure, fan failure, high/low furnace pressure, loss of purge and cooling air supplies, loss of control medium, air heater blockages and fires.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations.

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UEPOPS314B Operate and monitor fuel firing plant (gas or oil)

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to operate, inspect and monitor gas or oil firing plant.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships.

Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

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Prerequisite Unit(s) **4)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Plan and prepare work	1.1.	Safety issues are identified to comply with enterprise/site requirements
	1.2	Work requirements are identified from relevant personnel and documentation
	1.3	Documentation to determine plant status is assessed and evaluated
	1.4	Localised plant inspection, pre-operational tests and field preparations for service are carried out in accordance with manufacturer and enterprise/site procedures
	1.5	Plant operational pre-requisites are established in accordance with manufacturer and enterprise/site procedures
	1.6	Sequence for recommissioning of plant is determined to suit existing circumstances in accordance with enterprise/site requirements
	1.7	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2 Operate plant	2.1	Plant is operated in accordance with enterprise and manufacturer operating procedures
	2.2	Plant is monitored and observed to detect deviations from normal operating conditions
	2.3	Corrective actions are taken to rectify abnormalities in accordance with manufacturer and enterprise/site procedures
3 Test plant operation	3.1	Tests are performed in accordance with defined procedures applicable to the operational test
	3.2	Plant is observed for correct operational response
	3.3	Corrective action is taken when response is not in accordance with documentation, plant

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ELEMENT		PERFORMANCE CRITERIA	
			integrity or personnel safety requirements
		3.4	Plant is returned to required operational status upon completion of test
4	Analyse plant faults	4.1	Causes of abnormal plant operating conditions are identified by analysing the technical and operational information in a logical and sequential manner
		4.2	Corrective action taken is in accordance with enterprise procedures
		4.3	Plant integrity and personnel safety is maintained through consultation with appropriate personnel, and with reference to plant, technical and operational documentation
5	Monitor and inspect plant	5.1	Plant to be monitored/inspected is physically identified
		5.2	Plant is monitored/inspected for normal operation or to detect deviations
		5.3	Corrective action taken is in accordance with enterprise procedures
		5.4	Appropriate personnel are notified when defects are detected
6	Complete documentation	6.1	Documentation is updated and plant problems, movements, abnormalities and status are reported and logged in accordance with enterprise/site procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of operating and monitoring fuel firing plants (gas or oil).

All knowledge and skills detailed in this unit should be contextualised to current

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REQUIRED SKILLS AND KNOWLEDGE

industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO314B Fuel firing plant (gas or oil)

Evidence shall show that knowledge has been acquired for safe working practices of:

T1 Relevant Environmental, Occupational Health and Safety legislation and regulations

T2 Enterprise procedures

T3 Plant drawings and manufacturers manuals

T4 Introduction to and typical arrangements of power production plant

T5 Relevant plant and equipment, its location and operating parameters

T6 Electric motor types and characteristics

T7 Pump and compressor types and characteristics

T8 Valve, damper and actuator types and characteristics

T9 Switchgear types and characteristics

T10 Electrical protection types and characteristics

T11 Relevant state and territory regulations

T12 Fuel firing plant, types and characteristics

T13 Principles governing efficient combustion

T14 Properties of matter

T15 Properties of fuels

T16 Plant status

T17 Enterprise recording procedures

T18 Control and data acquisition systems

KS02-PO314B Fuel firing plant (gas or oil)

Specific skills needed to achieve the Performance Criteria:

T1 Interpret plant drawings and manufacturers manuals

T2 Apply relevant state and territory regulations

T3 Apply enterprise recording procedures

T4 Identify plant status

T5 Prepare plant/equipment for operation

T6 Organise resources

T7 Operate fuel firing plant

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REQUIRED SKILLS AND KNOWLEDGE

T8 Apply diagnostic and testing techniques

T9 Identify and respond to abnormal plant operating conditions

T10 Plan and prioritise work

T11 Use relevant hand tools

T12 Communicate effectively

T13 Apply data analysis techniques and tools

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

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The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures

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- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Preparation and planning of work
  - Operation of fuel firing plant
  - Operationally testing plant
  - Analysing plant faults
  - Monitoring plant operation
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items

Context of and specific resources for assessment **9.3)**

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment **9.4)**

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This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the unit of competency as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Plant and equipment may include electrical supply switchboard; supervisory, protection, alarm and control equipment; gas supply system; gas ignition system; fire protection systems; valves, actuators and dampers (electric, hydraulic, pneumatic and manual); compressed air systems; ignition and cooling air; filters, strainers, pressure control devices, oil supply system; oil ignition system compressors and pumps; auxiliary steam systems and gas and/or oil guns.

Safety standards may include relevant sections of Occupational Health and Safety legislation, enterprise safety rules, relevant state and federal legislation, national standards for plant and environmental legislation.

Information and documentation sources may include verbal or written communications; enterprise safety rules documentation; enterprise operating instructions; dedicated computer equipment; enterprise/site standing and operating

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RANGE STATEMENT

instructions; enterprise log books; manufacturer operation and maintenance manuals; and equipment and alarm manuals.

Technical and operational indicators may include stimuli (audio, smell, touch, visual), local indicators and recorders, computers and alarms (visible and or audible).

Communications may be by means of telephone, two way radio, pager, public address system, computer (electronic mail) and operating log (written or verbal).

Tests may include post maintenance operating tests and stand-by plant tests.

Appropriate personnel to consult, give or receive direction may include supervisor/team leader or equivalent, technical and engineering officers or equivalent, power system control personnel or equivalent; contractor and specialist personnel, maintenance staff and power plant operations personnel.

Test, fault finding and operating tools may include gas detector, power or hand tools and control system equipment.

Operating environment may be during inclement or otherwise harsh weather conditions, in wet/noisy/dusty/hot areas, during night periods and during continuous operation.

Faults and abnormal operating conditions may include motor/pump/ actuator/valve/dampers failure/malfunctions, control equipment failure/ malfunctions, loss of electrical supply to plant and equipment, excessive vibration of pumps/motors, high filter/strainer differentials, delivery system blockages, fuel preparation and delivery system fires, pipe fracture and leaks.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations.

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UEPOPS315B Operate and monitor fuel firing plant (coal)

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to operate, inspect and monitor coal firing plant.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships.

Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

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Prerequisite Unit(s) **4)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and prepare work	1.1 Safety issues are identified to comply with enterprise/site requirements
	1.2 Work requirements are identified from relevant personnel and documentation
	1.3 Documentation to determine plant status is assessed and evaluated
	1.4 Localised plant inspection, pre-operational tests and field preparations for service are carried out in accordance with manufacturer and enterprise/site procedures
	1.5 Plant operational pre-requisites are established in accordance with manufacturer and enterprise/site procedures
	1.6 Sequence for recommissioning of plant is determined to suit existing circumstances in accordance with enterprise/site requirements
	1.7 Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2 Operate plant	2.1 Plant is operated in accordance with enterprise and manufacturer operating procedures
	2.2 Plant is monitored and observed to detect deviations from normal operating conditions
	2.3 Corrective actions are taken to rectify abnormalities in accordance with manufacturer and enterprise/site procedures
3 Test plant operation	3.1 Tests are performed in accordance with defined procedures applicable to the operational test
	3.2 Plant is observed for correct operational response
	3.3 Corrective action is taken when response is not in accordance with documentation, plant

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ELEMENT		PERFORMANCE CRITERIA	
			integrity or personnel safety requirements
		3.4	Plant is returned to required operational status upon completion of test
4	Analyse plant faults	4.1	Causes of abnormal plant operating conditions are identified by analysing the technical and operational information in a logical and sequential manner
		4.2	Corrective action taken is in accordance with enterprise procedures
		4.3	Plant integrity and personnel safety is maintained through consultation with appropriate personnel, and with reference to plant, technical and operational documentation
5	Monitor and inspect plant	5.1	Plant to be monitored/inspected is physically identified
		5.2	Plant is monitored/inspected for normal operation or to detect deviations
		5.3	Corrective action taken is in accordance with enterprise procedures
		5.4	Appropriate personnel are notified when defects are detected
6	Complete documentation	6.1	Documentation is updated and plant problems, movements, abnormalities and status are reported and logged in accordance with enterprise/site procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of operating and monitoring fuel firing plants (coal)

All knowledge and skills detailed in this unit should be contextualised to current

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REQUIRED SKILLS AND KNOWLEDGE

industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO315B Fuel firing plant (coal)

Evidence shall show that knowledge has been acquired for safe working practices of:

T1 Relevant Environmental, Occupational Health and Safety legislation and regulations

T2 Enterprise procedures

T3 Plant drawings and manufacturers manuals

T4 Introduction to and typical arrangements of power production plant

T5 Relevant plant and equipment, its location and operating parameters

T6 Electric motor types and characteristics

T7 Pump and compressor types and characteristics

T8 Valve, damper and actuator types and characteristics

T9 Switchgear types and characteristics

T10 Electrical protection types and characteristics

T11 Relevant state and territory regulations

T12 Plant status

T13 Enterprise recording procedures

T14 Control and data acquisition systems

T15 Computers and software

T16 Emergency procedures

T17 Properties of matter

T18 Lubrication and bearings

T19 Fans types and characteristics

T20 Properties of matter

T21 Properties of fuels

T22 Principles governing efficient combustion

T23 Coal Feeders, types and characteristics

T24 Coal pulverisers/crushers types and characteristics

T25 Electrical principles

KS02-PO315B Fuel firing plant (coal)

Specific skills needed to achieve the Performance Criteria:

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REQUIRED SKILLS AND KNOWLEDGE

T1 Interpret plant drawings and manufacturers manuals

T2 Apply relevant state and territory regulations

T3 Apply enterprise recording procedures

T4 Identify plant status

T5 Prepare plant/equipment for operation

T6 Organise resources

T7 Operate coal firing plant

T8 Apply diagnostic and testing techniques

T9 Identify and respond to abnormal plant operating conditions

T10 Plan and prioritise work

T11 Use relevant hand tools;

T12 Communicate effectively

T13 Apply data analysis techniques and tools

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the

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competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
    - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control

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measures as specified in the Performance Criteria and Range Statement
- Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
- Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
- Demonstrate an appropriate level of employability skills
- Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures

- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Preparation and planning of work
  - Operation of coal firing plant
  - Operationally testing plant
  - Analysing plant faults
  - Monitoring plant operation
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of

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work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment

9.4)

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the unit of competency as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Plant and equipment may include electrical supply switchboard(s) and transformers;

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RANGE STATEMENT

supervisory, alarm, protection and control equipment; coal supply system; coal feeders; coal mills/pulverisers; fuel safety system; fire protection systems; compressors and pumps; valves, actuators and dampers (electric, hydraulic, pneumatic and manual); pulse air systems; and electric motors

Safety standards may include relevant sections of Occupational Health and Safety legislation, enterprise safety rules, relevant state and federal legislation, national standards for plant and environmental legislation

Information and documentation sources may include verbal or written communications; enterprise safety rules documentation; enterprise operating instructions; dedicated computer equipment; enterprise/site standing and operating instructions; enterprise log books; manufacturer operation and maintenance manuals; and equipment and alarm manuals.

Technical and operational indicators may include stimuli (audio, smell, touch, visual), local indicators and recorders, computers and alarms (visible and or audible).

Communications may be by means of telephone, two way radio, pager, computer (electronic mail), operating log (written or verbal) and public address system.

Tests may include post maintenance operating tests, stand-by plant tests, tests for coal quality.

Appropriate personnel to consult, give or receive direction may include supervisor/team leader or equivalent, technical and engineering officers or equivalent, power system control personnel or equivalent; contractor and specialist personnel, maintenance staff and power plant operations personnel.

Test, fault finding, operating tools may include power / hand tools and control system equipment.

Operating environment may be during inclement or otherwise harsh weather conditions, in wet/noisy/dusty/hot areas and during continuous operation.

Faults and abnormal operating conditions may include motor/pump/ actuator/valve/dampers failure/malfunctions, control equipment failure/ malfunctions, loss of electrical supply to plant and equipment, excessive vibration pumps/motors, high filter/strainer differentials, delivery system blockages, fuel preparation and delivery system fires.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

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Competency Field

Competency Field **11)**

Operations.

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UEPOPS316B Operate and monitor boiler steam/water cycle

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to operate, inspect and monitor boiler steam / water cycle.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships

Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

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Prerequisite Unit(s) **4)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisites units

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Plan and prepare work	1.1	Safety issues are identified to comply with enterprise/site and legislative requirements
	1.2	Work requirements are identified from relevant personnel and documentation
	1.3	Documentation to determine plant status is assessed and evaluate
	1.4	Localised plant inspection, pre-operational checks and field preparations for service are carried out in accordance with manufacturer and enterprise/site procedures
	1.5	Plant operational pre-requisites are established in accordance with manufacturer and enterprise/site procedures
	1.6	Sequence for recommissioning of plant is determined to suit existing circumstances in accordance with enterprise/site requirements
	1.7	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2 Operate plant	2.1	Plant is operated in accordance with enterprise and manufacturer operating procedures
	2.2	Plant is monitored and observed to detect deviations from normal operating conditions
	2.3	Corrective actions taken or reported, to rectify abnormalities, are in accordance with industry standards and site requirements
	2.4	Plant to be removed from service is locally identified and is removed from service in accordance with enterprise/site requirements
	2.5	Corrective actions are taken in accordance with enterprise safety rules and site requirements when abnormalities are identified during the removal from service

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ELEMENT		PERFORMANCE CRITERIA	
3	Test plant operation	3.1	Tests are performed in accordance with defined procedures applicable to the operational test
		3.2	Plant is observed for correct operational response
		3.3	Corrective action is taken when response is not in accordance with documentation, plant integrity or personnel safety requirements
		3.4	Plant is returned to required operational status upon completion of test
4	Analyse plant faults	4.1	Causes of abnormal plant operating conditions are identified by analysing the technical and operational information in a logical and sequential manner
		4.2	Corrective action taken is in accordance with enterprise/site procedures
		4.3	Plant integrity and personnel safety are maintained through consultation with appropriate personnel, and with reference to plant, technical and operational documentation
5	Monitor and inspect plant	5.1	Plant to be monitored/inspected is physically identified
		5.2	Plant is monitored/inspected for normal operation or to detect deviations
		5.3	Corrective action taken is in accordance with enterprise/site procedures
		5.4	Appropriate personnel are notified when defects are detected
6	Complete documentation	6.1	Documentation is updated and plant problems, movements, and abnormalities and status are reported and logged in accordance with enterprise/site procedures

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of operating and monitoring boiler steam/water cycles.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO 316B Boiler steam/water cycle

Evidence shall show that knowledge has been acquired for safe working practices of:

T1 Relevant Environmental, Occupational Health and Safety legislation and regulations

T2 Enterprise procedures

T3 Plant drawings and manufacturers manuals

T4 Introduction to and typical arrangements of power production plant

T5 Relevant plant and equipment, its location and operating parameters

T6 Electric motor types and characteristics

T7 Pump and compressor types and characteristics

T8 Valve, damper and actuator types and characteristics

T9 Switchgear types and characteristics

T10 Electrical protection types and characteristics

T11 Relevant state and territory regulations

T12 Plant status

T13 Enterprise recording procedures

T14 Control and data acquisition systems

T15 Boiler drains and traps types and characteristics

T16 Thermodynamics

T17 Principles governing efficient combustion

T18 Properties of matter

T19 Boiler steam/water cycle fundamentals

T20 Boiler steam/water systems, types and characteristics

T21 Economiser and superheater types and characteristics

T22 Principles of steam temperature control

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REQUIRED SKILLS AND KNOWLEDGE

KS02-PO 316B Boiler steam/water cycle

Specific skills needed to achieve the Performance Criteria:

T1 Interpret plant drawings and manufacturers manuals

T2 Apply relevant state and territory regulations

T3 Apply enterprise recording procedures

T4 Identify plant status

T5 Prepare plant/equipment for operation

T6 Organise resources

T7 Operate boiler water/steam cycle

T8 Apply diagnostic and testing techniques

T9 Identify and respond to abnormal plant operating conditions

T10 Plan and prioritise work

T11 Use relevant hand tools;

T12 Communicate effectively

T13 Apply data analysis techniques and tools

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment

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is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:

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- Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
- Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
- Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
- Demonstrate an appropriate level of employability skills
- Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures

- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Preparation and planning of work
  - Operation of boiler water/steam cycle
  - Operationally testing plant
  - Analysing plant faults
  - Monitoring plant operation
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary

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evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment

9.4)

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the unit of competency as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

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RANGE STATEMENT

Systems, plant and/or equipment may include electrical supply switchboard(s) and transformers; electrical motors; valves and actuators (electric, hydraulic and pneumatic); supervisory, alarm, protection and control equipment; boiler circulation systems; boiler filling systems; boiler venting and draining systems; cooling water plant and equipment; filters; strainers; moisture removal devices; pressure control devices; safety devices; high and low pressure systems; and boiler water level indicators.

Safety standards may include relevant sections of Occupational Health and Safety legislation, enterprise safety rules, relevant state and federal legislation, national standards for plant and Australian standards.

Information and documentation sources may include verbal or written communications; enterprise safety rules documentation; equipment and alarm manuals; dedicated computer equipment; enterprise standing and operating instructions; and enterprise log books.

Technical and operational indicators may include stimuli (audio, smell, touch, visual), remote or local indicators and recorders and alarms (visible and or audible).

Communications may be by means of telephone, two way radio, pager, computer (electronic mail), operating log (written or verbal) and public address system.

Tests may include laboratory test for water quality and impurities, alarm testing, leak test and safety valve float.

Appropriate personnel to consult, give or receive direction may include; supervisor/team leader or equivalent, power plant operations personnel or equivalent, technical and engineering officers or equivalent, maintenance staff and contractor personnel.

Test, fault finding and operating tools may include power or hand tools.

Operating environment may be during inclement or otherwise harsh weather conditions, in wet/noisy/dusty/hot areas and during continuous operation.

Faults and abnormal operating conditions may include motor/pump/ actuator/valve failure/malfunctions, control equipment failure/malfunctions, loss of electrical supply to plant and equipment, excessive vibration pumps/motors, loss/low cooling water pressure, boiler tube leaks, low/high steam pressure/temperature, plant equipment failure and loss of control air supply.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

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Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations.

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UEPOPS317B Operate and monitor fixed fire protection systems

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to operate, inspect and monitor fixed fire protection systems.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships.

Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

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Prerequisite Unit(s) **4)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and prepare work	1.1 Safety issues are identified to comply with enterprise/site requirements
	1.2 Work requirements are identified from relevant personnel and documentation
	1.3 Documentation to determine plant status is assessed and evaluated
	1.4 Localised plant inspection and field preparations for service are carried out in accordance with manufacturer and enterprise procedures
	1.5 Plant operational pre-requisites are established in accordance with manufacturer and enterprise procedures
	1.6 Sequence for recommissioning of plant is determined to suit existing circumstances in accordance with enterprise requirements
	1.7 Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2 Operate plant	2.1 Plant is operated in accordance with enterprise and manufacturer operating procedures
	2.2 Plant is monitored and observed to detect deviations from normal operating conditions
	2.3 Corrective actions are taken to rectify abnormalities in accordance with manufacturer and enterprise procedures
3 Test plant operation	3.1 Tests are performed in accordance with defined procedures applicable to the operational test
	3.2 Plant is observed for correct operational response in accordance with enterprise / manufacturers requirements
	3.3 Correct action is taken in accordance with enterprise procedures

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ELEMENT		PERFORMANCE CRITERIA	
		3.4	Plant is returned to required operational status upon completion of test
4	Analyse system faults	4.1	Causes of abnormal plant operating conditions are identified by analysing the technical and operational information in a logical and sequential manner
		4.2	Corrective action taken is in accordance with enterprise procedures
		4.3	Plant integrity and personnel safety are maintained through consultation with appropriate personnel, and with reference to plant, technical and operational documentation
5	Monitor and inspect plant	5.1	Plant to be monitored/inspected is physically identified
		5.2	Plant is monitored/inspected for normal operation or to detect deviations
		5.3	Corrective action taken is in accordance with enterprise procedures
		5.4	Appropriate personnel are notified when defects are detected
6	Complete Documentation	6.1	Documentation is updated and plant problems, movements, abnormalities and status are reported and logged in accordance with enterprise/site procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence must show that knowledge has been acquired of safe working practices and operate and monitor fixed fire protection systems.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

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REQUIRED SKILLS AND KNOWLEDGE

KS01-PO317B Operate and monitor fixed fire protection systems

Evidence shall show an understanding of how to operate and monitor fixed fire protection systems, to an extent indicated by the following aspects:

T1 Principles of combustion

- Fire triangle
- Agents used to control and extinguish fires.
- Fire hazards in electricity generation plants.

T2 Fire suppression systems:

- Types:
  - Water deluge;
  - Foam;
  - Halon;
  - Gas;
  - CO2.
- Theory of operation
- Hazards of gas fire suppression systems

T3 Interpretation of documentation:

- Hard-copy and computer-based documentation;
  - Enterprise/site safety and emergency documentation;
  - Equipment and alarm manuals;
  - Enterprise/site log books;
  - Manufacturers' manuals.

T4 Fire protection system testing:

- Communication with Central Controller and other staff;
- Isolation of alarm system;
- Remote communications and data-logging systems testing;
- Stand-by power supply testing;
- Lamp indicator testing;
- Alarm testing;
- Valve testing.

T5 Confirmation of operational status of fire fighting and fire prevention equipment:

- Currency of inspection tags and log book entries;
- Fire and smoke detectors;
- Inventory and visual checks of extinguishers, fire blankets, hydrant reels, signage and other on-site fire fighting and fire prevention equipment;
- Valves, actuators and dampers in correct operating position;
- Availability of emergency water supply;

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REQUIRED SKILLS AND KNOWLEDGE

- Fire doors, fire walls and fire barriers;
- Fire pump engine
  - fuel supply;
  - lubrication;
  - starter battery;
  - coolant.

T6 Reporting, record and log keeping:

- as per Statutory, Enterprise and manufacturers' requirements;
- reporting of non-compliant fire protection or fire suppression systems or equipment.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place,

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access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit

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- Demonstrate an appropriate level of employability skills
- Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures

- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Preparation and planning of work
  - Operation of fixed fire protection systems
  - Operationally testing plant
  - Analysing plant faults
  - Monitoring plant operation
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

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Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines..

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the unit of competency as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Systems may include fire control, supervisory, alarm and control equipment; valves, actuators and dampers (electric, hydraulic, pneumatic and manual); storage plant; detectors water deluge; detection systems; foam, halon, gas and CO2 suppression systems.

Safety standards may include relevant sections of Occupational Health and Safety legislation enterprise safety rules, relevant state and federal legislation, national standards for plant and environmental legislation.

Information and documentation sources may include verbal and written communications, enterprise/site safety rules documentation/form(s), equipment and

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RANGE STATEMENT

alarm manuals, dedicated computer equipment, enterprise/site standing and operating instructions, enterprise/site log book and manufacturer operation and maintenance manuals.

Technical and operational indicators may include stimuli (audio, smell, touch, visual), local indicators and recorders, computers and alarms (visible and or audible).

Communications may be by means of telephone, two way radio, pager, public address system, facsimile, computer (electronic mail) and operating log (written or verbal).

Tests may include stand-by plant tests, post maintenance operating tests and alarm tests.

Appropriate personnel to consult, give or receive direction may include supervisor/team leader or equivalent, power system control personnel or equivalent, contractor and specialist personnel, maintenance staff and power plant operations personnel.

Test, fault finding and operating tools may include hand and power tools and CO2 equipment.

Operating environment may be during inclement or otherwise harsh weather conditions, in wet/noisy/dusty/hot areas, during night periods and during continuous operation.

Faults and abnormal operating conditions may include motor/pump/ actuator/valve/damper failure/malfunction, control equipment failure/ malfunctions, loss of electrical supply to plant and equipment, loss/ low air, water, lubricating oil to plant/ equipment, CO2 system faults/ malfunctions, CO2 leaks, high filter/ strainer dp, and excessive vibration pumps/ motors.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations.

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UEPOPS318B Operate and monitor compressed gas systems

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to operate compressed gas systems excluding air/steam.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships.

Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

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Prerequisite Unit(s) **4)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Plan and prepare work	1.1	Safety issues are identified to comply with enterprise/site requirements
	1.2	Work requirements are identified from relevant personnel and documentation
	1.3	Documentation to determine plant status is assessed and evaluated
	1.4	Localised plant inspection and field preparations for service are carried out in accordance with enterprise operational requirements
	1.5	Plant operational pre-requisites are established in accordance with manufacturer and enterprise/site requirements
	1.6	Sequence for recommissioning of plant is determined to suit existing circumstances in accordance with enterprise/site requirements
	1.7	Where appropriate the teams and individuals roles and responsibilities within the team are identified, and where required, assist in the provision of the on-the-job training
2 Operate plant	2.1	Plant is operated in accordance with enterprise, site and manufacturer operating procedures
	2.2	Plant is monitored and observed to detect deviations from normal operating conditions
	2.3	Corrective actions taken to rectify abnormalities are in accordance with enterprise and site requirements
	2.4	Plant to be removed from service is locally identified and removed from service in accordance with enterprise and site requirements
	2.5	Corrective actions are taken in accordance with enterprise safety rules and site requirements when abnormalities are identified during the removal from service

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ELEMENT		PERFORMANCE CRITERIA	
3	Test plant operation	3.1	Tests are performed in accordance with defined procedures applicable to the operational test
		3.2	Plant is observed for correct operational response
		3.3	Corrective action is taken when response is not in accordance with documentation, plant integrity or personnel safety requirements
		3.4	Plant is returned to required operational status upon completion of test
4	Analyse plant faults	4.1	Causes of abnormal plant operating conditions are identified by analysing the technical and operational information in a logical and sequential manner
		4.2	Corrective action taken is in accordance with enterprise procedures
		4.3	Plant integrity and personnel safety is maintained through consultation with appropriate personnel, and with reference to plant, technical and operational documentation
5	Monitor and inspect plant	5.1	Plant to be monitored/inspected is physically identified
		5.2	Plant is monitored/inspected for normal operation or to detect deviations
		5.3	Corrective action taken is in accordance with enterprise/site procedures
		5.4	Appropriate personnel are notified when defects are detected
6	Complete documentation	6.1	Documentation is updated and plant problems, movements, abnormalities and status are reported and logged in accordance with enterprise/site procedures

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of operating and monitoring compressed gas systems.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO318B Compressed gas systems

Evidence shall show that knowledge has been acquired for safe working practices of:

T1 Relevant Environmental, Occupational Health and Safety legislation and regulations

T2 Enterprise procedures

T3 Plant drawings and manufacturers manuals

T4 Introduction to and typical arrangements of power production plant

T5 Relevant plant and equipment, its location and operating parameters

T6 Electric motor types and characteristics

T7 Pump and compressor types and characteristics

T8 Valve, damper and actuator types and characteristics

T9 Switchgear types and characteristics

T10 Electrical protection types and characteristics

T11 Relevant state and territory regulations

T12 Plant status

T13 Enterprise recording procedures

T14 Communication principles

T15 Computers and software; Supervisory, alarm, protection and control equipment

T16 Emergency procedures

T17 Properties of gases, their uses and precautions to be taken

T18 Properties of matter

T19 Lubrication and bearings

KS01-PO318B Compressed gas systems

Specific skills needed to achieve the Performance Criteria:

T1 Interpret plant drawings and manufacturers manuals

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REQUIRED SKILLS AND KNOWLEDGE

T2 Apply relevant state and territory regulations

T3 Apply enterprise recording procedures

T4 Identify plant status

T5 Prepare plant/equipment for operation

T6 Organise resources

T7 Operate compressed gas systems

T8 Apply diagnostic and testing techniques

T9 Identify and respond to abnormal plant operating conditions

T10 Plan and prioritise work

T11 Use relevant hand tools

T12 Communicate effectively

T13 Apply data analysis techniques and tools

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full

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can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement

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- Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
- Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
- Demonstrate an appropriate level of employability skills
- Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures

- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Preparation and planning of work
  - Operation of compressed gas system
  - Operationally testing plant
  - Analysing plant faults
  - Monitoring plant operation
  - Knowledge of the properties of gases, their use and precautions to be taken
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of

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work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment

9.4)

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the unit of competency as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Systems, plant and or equipment may include electrical supply switchboard(s) and

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RANGE STATEMENT

transformers; compressors; electrical motors; valves, actuators and dampers (electric, hydraulic, pneumatic, mechanical and manual); supervisory, protection, alarm and control equipment; cooling water plant and equipment; filters; strainers; moisture removal devices; pressure control devices; safety devices; high and low pressure systems; and fans.

Gases may include nitrogen, ammonia, hydrogen and chlorine, carbon dioxide and Liquid Natural Gas.

Safety standards may include relevant sections of Occupational Health and Safety legislation, enterprise safety rules, relevant state and federal legislation, national standards for plant and Australian standards.

Information and documentation sources may include verbal and written communications, enterprise/site safety rules documentation/forms, equipment and alarm manuals, dedicated computer equipment, enterprise operating instructions, enterprise/site log book, enterprise standing instructions and plant notes and materials handling data sheets.

Technical and operational indicators may include stimuli (audio, smell, touch, visual), local indicators and recorders, computers and alarms (visible and or audible).

Communications may be by means of telephone, two way radio, pager, computer (electronic mail), operating log (written or verbal) and public address system.

Tests may include motor direction checks, stand-by plant “cut-in” tests and performance tests.

Appropriate personnel to consult, give or receive direction may include; supervisor/team leader or equivalent, power plant operations personnel or equivalent, technical and engineering officers or equivalent, contractor staff and maintenance staff.

Test, fault finding and operating tools may include hand and power tools, proving dead equipment and high voltage testers.

Operating environment may be during inclement or otherwise harsh weather conditions, in wet/noisy/dusty/hot areas and during continuous operation.

Faults and abnormal operating conditions may include motor/pump/actuator/ valve/damper failure/malfunction, control equipment failure/malfunctions, loss of electrical supply to plant and equipment, loss/low cooling air/water, lubricating/power oil flow to plant/equipment, excessive vibration pumps/motors, high air/oil strainer /filter/ differentials, moisture removal plant and equipment malfunctions and excessive vibration pumps/motors.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

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Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations.

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UEPOPS319B Operate and monitor gas production plant

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to operate, inspect and monitor gas producing plant.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships

Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

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Prerequisite Unit(s) **4)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and prepare work	1.1 Safety issues are identified to comply with enterprise/site requirements
	1.2 Work requirements are identified from relevant personnel and documentation
	1.3 Documentation to determine plant status is assessed and evaluated
	1.4 Localised plant inspection and field preparation for service are carried out in accordance with manufacturer and enterprise procedures
	1.5 Plant operational pre-requisites are established in accordance with manufacturer and enterprise procedures
	1.6 Sequence for recommissioning of plant is determined to suit existing circumstances in accordance with enterprise/site requirements
	1.7 Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2 Operate plant	2.1 Plant is operated in accordance with enterprise and manufacturer operating procedures
	2.2 Plant is monitored and observed to detect deviations from normal operating conditions
	2.3 Corrective actions taken to rectify abnormalities in accordance with manufacturer and enterprise procedures
3 Test plant operation	3.1 Tests are performed in accordance with defined procedures applicable to the operational test
	3.2 Plant is observed for correct operational response
	3.3 Corrective action is taken when response is not in accordance with documentation, plant integrity or personnel safety requirements

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ELEMENT		PERFORMANCE CRITERIA	
		3.4	Plant is returned to required operational status upon completion of test
4	Analyse plant faults	4.1	Causes of abnormal plant operating conditions are identified by analysing the technical and operational information in a logical and sequential manner
		4.2	Corrective action taken is in accordance with enterprise/site procedures
		4.3	Plant integrity and personnel safety is maintained through consultation with appropriate personnel, and with reference to plant, technical and operational documentation
5	Monitor and inspect plant	5.1	Plant to be monitored/inspected is physically identified
		5.2	Plant is monitored/inspected for normal operation or to detect deviations
		5.3	Correct action taken is in accordance with enterprise/site procedures
		5.4	Appropriate personnel are notified when defects are detected
6	Complete documentation	6.1	Documentation is updated and plant problems, movements, abnormalities and status are reported and logged in accordance with enterprise/site procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of operating and monitoring gas production plants.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

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REQUIRED SKILLS AND KNOWLEDGE

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO319B Gas production plant

Evidence shall show that knowledge has been acquired for safe working practices of:

T1 Relevant Environmental, Occupational Health and Safety legislation and regulations

T2 Enterprise procedures

T3 Plant drawings and manufacturers manuals

T4 Introduction to and typical arrangements of power production plant

T5 Relevant plant and equipment, its location and operating parameters

T6 Electric motor types and characteristics

T7 Pump and compressor types and characteristics

T8 Valve, damper and actuator types and characteristics

T9 Switchgear types and characteristics

T10 Electrical protection types and characteristics

T11 Relevant state and territory regulations

T12 Plant status

T13 Enterprise recording procedures

T14 Supervisory, alarm, protection and control equipment

T15 Properties of gases, their uses and precautions to be takenT16 Properties of matter

T16 Lubrication and bearings

T17 Electrical principles

KS02-PO319B Gas production plant

Specific skills needed to achieve the Performance Criteria:

T1 Interpret plant drawings and manufacturers manuals

T2 Apply relevant state and territory regulations

T3 Apply enterprise recording procedures

T4 Identify plant status

T5 Prepare plant/equipment for operation

T6 Organise resources

T7 Operate gas production plant

T8 Apply diagnostic and testing techniques

T9 Identify and respond to abnormal plant operating conditions

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REQUIRED SKILLS AND KNOWLEDGE

T10 Plan and prioritise work

T11 Use relevant hand tools

T12 Communicate effectively

T13 Apply data analysis techniques and tools.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence

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need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Knowledge and application of relevant sections of:

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Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures

- Preparation and planning of work
- Operation of gas production plant
- Operationally testing plant
- Analysing plant faults
- Monitoring plant operation
- Knowledge of the properties of gases, their uses and precautions to be taken
- Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment

9.4)

This unit shall be assessed by methods given in Section 1.3.00

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Assessment Guidelines.

Note: Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the unit of competency as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Systems, plant and/or equipment may include electrical supply switchboards; storage plant; heaters, electrical motors; valves, actuators and dampers (electric, hydraulic, pneumatic, manual); and supervisory, protection, alarm and control equipment.

Gas production plant may include carbon dioxide, ammonia, chlorine and hydrogen.

Safety standards may include relevant sections of Occupational Health and Safety legislation, enterprise safety rules, relevant state and federal legislation and national standards for plant.

Information and documentation sources may include verbal and written communications; enterprise/site safety rules documentation/form(s), enterprise/site standing and operating instructions, enterprise/site log book, manufacturer operation and maintenance manuals and dedicated computer equipment.

Technical and operational indicators may include stimuli (audio, smell, touch, visual), remote or local indicators and recorders, computers and alarms (visible and or audible).

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RANGE STATEMENT

Communications may be by means of telephone, two way radio, pager, public address system, computer (electronic mail) and operating log (written or verbal).

Tests may include stand-by plant tests, post maintenance operating tests and alarm tests

Appropriate personnel to consult, give or receive direction may include supervisor/team leader or equivalent, power system control personnel or equivalent, technical and engineering officers or equivalent, contractor and specialist personnel, maintenance staff and power plant operations personnel.

Test, fault finding and operating tools may include hand and power tools and leak detection equipment.

Operating environment may be during inclement or otherwise harsh weather conditions, in wet/noisy/dusty/hot areas and during continuous operation.

Faults and abnormal operating conditions may include motor/pump/ actuator/valve/ dampers failure/malfunctions, control equipment failure/ malfunctions, loss of electrical supply to plant and equipment, loss/low air, water, lubricating oil to plant/equipment, gas system faults/malfunctions, gas leaks, high filter/strainer dp and excessive vibration pumps/motors.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations.

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UEPOPS320B Operate and monitor compressed air systems

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to operate compressed air systems.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships.

Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

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Prerequisite Unit(s) **4)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisites units

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Plan and prepare work	1.1	Safety issues are identified to comply with enterprise/site requirements
	1.2	Work requirements are identified from relevant personnel and documentation
	1.3	Documentation to determine plant status is assessed and evaluated
	1.4	Localised plant inspection and field preparation for service are carried out in accordance with enterprise operational requirements
	1.5	Plant operational pre-requisites are established in accordance with manufacturer and enterprise/site requirements
	1.6	Sequence for recommissioning of plant is determined to suit existing circumstances in accordance with enterprise/site requirements
	1.7	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2 Operate plant	2.1	Plant is operated in accordance with enterprise, site and manufacturer operating procedures
	2.2	Plant is monitored and observed to detect deviations from normal operating conditions
	2.3	Corrective actions taken to rectify abnormalities are in accordance with enterprise and site requirements
	2.4	Plant is to be removed from service is locally identified and removed from service in accordance with enterprise and site requirements
	2.5	Corrective actions are taken in accordance with enterprise safety rules and site requirements when abnormalities are identified during the removal from service

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ELEMENT		PERFORMANCE CRITERIA	
3	Test plant operation	3.1	Tests are performed in accordance with defined procedures applicable to the operational test
		3.2	Plant is observed for correct operational response
		3.3	Corrective action is taken when response is not in accordance with documentation, plant integrity or personnel safety requirements
		3.4	Plant is returned to required operational status upon completion of test
4	Analyse plant faults	4.1	Causes of abnormal plant operating conditions are identified by analysing the technical and operational information in a logical and sequential manner
		4.2	Corrective action taken is in accordance with enterprise procedures
		4.3	Plant integrity and personnel safety is maintained through consultation with appropriate personnel, and with reference to plant, technical and operational documentation
5	Monitor and inspect plant	5.1	Plant to be monitored/inspected is physically identified
		5.2	Plant is monitored/inspected for normal operation or to detect deviations
		5.3	Corrective action taken is in accordance with enterprise/site procedures
		5.4	Appropriate personnel are notified when defects are detected
6	Complete documentation	6.1	Documentation is updated and plant problems, movements, abnormalities and status are reported and logged in accordance with enterprise/site procedures

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of operating and monitoring compressed air systems.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO320B Compressed air systems

Evidence shall show that knowledge has been acquired for safe working practices of:

T1 Relevant Environmental, Occupational Health and Safety legislation and regulations

T2 Enterprise procedures

T3 Plant drawings and manufacturers manuals

T4 Introduction to and typical arrangements of power production plant

T5 Relevant plant and equipment, its location and operating parameters

T6 Electric motor types and characteristics

T7 Pump and compressor types and characteristics

T8 Valve, damper and actuator types and characteristics

T9 Switchgear types and characteristics

T10 Electrical protection types and characteristics

T11 Plant status

T12 Air Dryers types and characteristics

T13 Enterprise recording procedures

T14 Supervisory, alarm, protection and control equipment

KS02-PO320B Compressed air systems

Specific skills needed to achieve the Performance Criteria:

T1 Interpret plant drawings and manufacturers manuals

T2 Identify plant status

T3 Prepare plant/equipment for operation;

T4 Organise resources

T5 Operate compressed gas systems

T6 Apply diagnostic and testing techniques

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REQUIRED SKILLS AND KNOWLEDGE

T7 Identify and respond to abnormal plant operating conditions

T8 Plan and prioritise work

T9 Use relevant hand tools

T10 Communicate effectively

T11 Apply data analysis techniques and tools.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical

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equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of

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contexts from the prescribed items below:

- Knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
- Preparation and planning of work
- Operation of compressed gas systems
- Operationally testing plant
- Analysing plant faults
- Monitoring plant operation
- Knowledge of the properties of gases, their use and precautions to be taken
- Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items

Context of and specific resources for assessment **9.3)**

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of **9.4)**

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assessment

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit

Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the unit of competency as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Systems, plant and/or equipment may include electrical supply switchboard(s) and transformers; compressors; electrical motors; valves, actuators and dampers (electric, hydraulic, pneumatic, mechanical and manual); supervisory, protection, alarm and control equipment; cooling water plant and equipment; filters, strainers, moisture removal devices, pressure control devices, safety devices; and high and low pressure systems and fans.

Safety standards may include relevant sections of Occupational Health and Safety legislation, enterprise safety rules, relevant state and federal legislation, national standards for plant and Australian standards.

Information and documentation sources may include verbal and written communications, enterprise/site safety rules documentation/forms, equipment and

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RANGE STATEMENT

alarm manuals, dedicated computer equipment, enterprise operating instructions, enterprise/site log book, enterprise standing instructions and plant notes and materials handling data sheets.

Technical and operational indicators may include stimuli (audio, smell, touch, visual), remote or local indicators and recorders and alarms (visible and or audible).

Communications may be by means of telephone, two way radio, pager, computer (electronic mail), operating log (written or verbal) and public address system.

Tests may include motor direction checks, stand-by plant “cut-in” tests and performance tests.

Appropriate personnel to consult, give or receive direction may include supervisor/team leader or equivalent, power plant operations personnel or equivalent, technical and engineering officers or equivalent, contractor staff and maintenance staff.

Test, fault finding and operating tools may include hand and power tools, proving dead equipment and high voltage testers.

Operating environment may be during inclement or otherwise harsh weather conditions, in wet/noisy/dusty/hot areas and during continuous operation.

Faults and abnormal operating conditions may include motor/pump/actuator/ valve/ damper failure/malfunction, control equipment failure/malfunctions, loss of electrical supply to plant and equipment, loss/low cooling air/water, lubricating/power oil flow to plant/equipment, excessive vibration pumps/motors, high air/oil strainer /filter/ differentials, moisture removal plant and equipment malfunctions and excessive vibration pumps/motors.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations.

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UEPOPS321B Operate and monitor water treatment plant

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to operate, inspect and monitor water treatment and purification plant.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships.

Pre-Requisites

Prerequisite Unit(s) **4)**

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Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Plan and prepare work	1.1	Safety issues are identified to comply with enterprise/site requirements
	1.2	Work requirements are identified from relevant personnel and documentation
	1.3	Documentation to determine plant status is assessed and evaluated
	1.4	Localised plant inspection and field preparation for service are carried out in accordance with manufacturer and enterprise procedures
	1.5	Plant operational pre-requisites are established in accordance with manufacturer and enterprise procedures
	1.6	Sequence for recommissioning of plant is determined to suit existing circumstances in accordance with enterprise/site requirements
	1.7	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2 Operate plant	2.1	Plant is operated in accordance with enterprise and manufacturer operating procedures
	2.2	Plant is monitored and observed to detect deviations from normal operating conditions
	2.3	Corrective actions taken to rectify abnormalities in accordance with manufacturer and enterprise procedures
3 Test plant operation	3.1	Tests are performed in accordance with defined procedures applicable to the operational test
	3.2	Plant is observed for correct operational response
	3.3	Corrective action is taken when response is not in accordance with documentation, plant

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ELEMENT		PERFORMANCE CRITERIA	
			integrity or personnel safety requirements
		3.4	Plant is returned to required operational status upon completion of test
4	Analyse plant faults	4.1	Causes of abnormal plant operating conditions are identified by analysing the technical and operational information in a logical and sequential manner
		4.2	Corrective action taken is in accordance with enterprise/site procedures
		4.3	Plant integrity and personnel safety is maintained through consultation with appropriate personnel, and reference to plant, technical and operational documentation
5	Monitor and inspect plant	5.1	Plant to be monitored/inspected is physically identified
		5.2	Plant is monitored/inspected for normal operation or to detect deviations
		5.3	Corrective action taken is in accordance with enterprise/site procedures
		5.4	Appropriate personnel are notified when defects are detected
6	Complete documentation	6.1	Documentation is updated and plant problems, movements, abnormalities and status are reported and logged in accordance with enterprise/site procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of operating and monitoring water treatment plants.

All knowledge and skills detailed in this unit should be contextualised to current

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REQUIRED SKILLS AND KNOWLEDGE

industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO321B Water treatment plant

Evidence shall show that knowledge has been acquired for safe working practices of:

T1 Relevant Environmental, Occupational Health and Safety legislation and regulations

T2 Enterprise procedures

T3 Plant drawings and manufacturers manuals

T4 Introduction to and typical arrangements of power production plant

T5 Relevant plant and equipment, its location and operating parameters

T6 Electric motor types and characteristics

T7 Pump and compressor types and characteristics

T8 Valve, damper and actuator types and characteristics

T9 Switchgear types and characteristics

T10 Electrical protection types and characteristics

T11 Water chemistry

T12 Relevant chemicals, uses and hazards

T13 Fundamentals of water treatment

T14 Water treatment plants, types and characteristics

T15 Plant status

T16 Enterprise recording procedures

T17 Control and data acquisition systems

T18 Computers and software

T19 Properties of matter

T20 Lubrication and bearings

T21 Electrical principles

KS02-PO321B Water treatment plant

Specific skills needed to achieve the Performance Criteria:

T1 Interpret plant drawings and manufacturers manuals

T2 Apply enterprise recording procedures

T3 Identify plant status

T4 Prepare plant/equipment for operation

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REQUIRED SKILLS AND KNOWLEDGE

T5 Organise resources

T6 Operate water treatment plant

T7 Apply diagnostic and testing techniques

T8 Identify and respond to abnormal plant operating conditions

T9 Plan and prioritise work

T10 Use relevant hand tools

T11 Communicate effectively

T12 Apply data analysis techniques and tools

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

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Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with

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the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Preparation and planning of work
  - Operation of water treatment plant
  - Operationally testing plant
  - Analysing plant faults
  - Monitoring plant operation
  - Material safe data sheets
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items

Context of and specific resources for assessment **9.3)**

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

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- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note: Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

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Range Statement

RANGE STATEMENT

10) This relates to the unit of competency as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Systems, plant and/or equipment may include electrical supply switchboard(s) and transformers; electrical motors; valves, actuators and dampers (electric, hydraulic, pneumatic, manual); supervisory, protection, alarm and control equipment; dams de-sanding chambers canals and pipelines; lime softening plant; acid cleaning equipment; chemical storage vessels; pressure vessels; water clarifying plant; water filtering plant; cation and anion exchangers; degassers; mixed bed exchangers; compressors and pumps; trash screens; flock level control and caustic cleaning.

Safety standards may include relevant sections of Occupational Health and Safety legislation, enterprise safety rules, relevant state and federal legislation, national standards for plant.

Information and documentation sources may include verbal and written communications, enterprise/site safety rules documentation/forms, enterprise/site standing and operating instructions, enterprise/site log book, manufacturer operation and maintenance manuals, dedicated computer equipment and equipment and alarm manuals.

Technical and operational indicators may include stimuli (audio, smell, touch, visual), local indicators and recorders and alarms (visible and or audible).

Communications may be by means of telephone, two way radio, pager, , pager, public address system, computer (electronic mail) and operating log (written or verbal).

Tests may include motor direction checks, stand-by plant “cut-in” tests and performance tests.

Appropriate personnel to consult, give or receive direction may include, supervisor/team leader or equivalent, power system control personnel or equivalent, technical and engineering officers or equivalent, contractor and specialist personnel, maintenance staff and power plant operations personnel.

Test, fault finding and operating tools may include hand and power tools and control system equipment.

Operating environment may be during inclement or otherwise harsh weather conditions, in wet/noisy/dusty/hot areas and during continuous operation.

Faults and abnormal operating conditions may include motor/pump/actuator/ valve/ damper failure/malfunction, control equipment failure/malfunctions, loss of electrical supply to plant and equipment, process chemical limits exceeded, process chemicals leaks/spillages, loss of resin, high filter/strainer differential pressure and conductivity/silica limitations.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information

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RANGE STATEMENT

and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations.

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UEPOPS322B Operate and monitor alkalinity reduction plant

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to operate, inspect and monitor alkalinity reduction plant which includes cooling tower water dosing plant.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships.

Pre-Requisites

Prerequisite Unit(s) **4)**

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Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Plan and prepare work	1.1	Safety issues are identified to comply with enterprise/site requirements
	1.2	Work requirements are identified from relevant personnel and documentation
	1.3	Documentation to determine plant status is assessed and evaluated
	1.4	Localised plant inspection and field preparation for service are carried out in accordance with manufacturer and enterprise procedures
	1.5	Plant operational pre-requisites are established in accordance with manufacturer and enterprise procedures
	1.6	Sequence for recommissioning of plant is determined to suit existing circumstances in accordance with enterprise/site requirements
	1.7	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2 Operate plant	2.1	Plant is operated in accordance with enterprise and manufacturer operating procedures
	2.2	Plant is monitored and observed to detect deviations from normal operating conditions
	2.3	Corrective actions taken to rectify abnormalities in accordance with manufacturer and enterprise procedures
	2.4	Plant to be removed from service is locally identified and removed from service in accordance with enterprise/site requirements
	2.5	Corrective actions are taken in accordance with enterprise safety rules and site requirements when abnormalities are identified during the removal from service

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ELEMENT		PERFORMANCE CRITERIA	
3	Test plant operation	3.1	Tests are performed in accordance with defined procedures applicable to the operational test
		3.2	Plant is observed for correct operational response
		3.3	Corrective action is taken when response is not in accordance with documentation, plant integrity or personnel safety requirements
		3.4	Plant is returned to required operational status upon completion of test
4	Analyse plant faults	4.1	Causes of abnormal plant operating conditions are identified by analysing the technical and operational information in a logical and sequential manner
		4.2	Corrective action taken is in accordance with enterprise/site procedures
		4.3	Plant integrity and personnel safety is maintained through consultation with appropriate personnel, and reference to plant, technical and operational documentation
5	Monitor and inspect plant	5.1	Plant to be monitored/inspected is physically identified
		5.2	Plant is monitored/inspected for normal operation or to detect deviations
		5.3	Corrective action taken is in accordance with company procedures
		5.4	Appropriate personnel are notified when defects are detected
6	Complete documentation	6.1	Documentation is updated and plant problems, movements, abnormalities and status are reported and logged in accordance with enterprise/site procedures

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of operating and monitoring alkalinity reduction plants.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO322B Alkalinity reduction plant

Evidence shall show that knowledge has been acquired for safe working practices of:

T1 Relevant Environmental, Occupational Health and Safety legislation and regulations

T2 Enterprise procedures

T3 Plant drawings and manufacturers manuals

T4 Introduction to and typical arrangements of power production plant

T5 Relevant plant and equipment, its location and operating parameters

T6 Electric motor types and characteristics

T7 Pump and compressor types and characteristics

T8 Valve, damper and actuator types and characteristics

T9 Switchgear types and characteristics

T10 Electrical protection types and characteristics

T11 Water chemistry

T12 Relevant chemicals, uses and hazardsT13 Electrical fundamentals

T13 Plant status

T14 Supervisory, alarm, protection and control equipment

T15 Lubrication and bearings

KS02-PO322B Alkalinity reduction plant

Specific skills needed to achieve the Performance Criteria:

T1 Interpret plant drawings and manufacturers manuals

T2 Identify plant status

T3 Prepare plant/equipment for operation

T4 Organise resources

T5 Operate alkalinity reduction plant

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REQUIRED SKILLS AND KNOWLEDGE

T6 Apply diagnostic and testing techniques

T7 Identify and respond to abnormal plant operating conditions

T8 Plan and prioritise work

T9 Use relevant hand tools

T10 Communicate effectively

T11 Apply data analysis techniques and tools

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

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The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures

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- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Preparation and planning of work
  - Operation of alkalinity reduction plant
  - Operationally testing plant
  - Analysing plant faults
  - Monitoring plant operation
  - Material safe data sheets
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items

Context of and specific resources for assessment **9.3)**

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of **9.4)**

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assessment

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note: Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the unit of competency as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Systems, plant and/or equipment may include electrical motors; valves, actuators and dampers (electric, hydraulic, pneumatic, and manual); supervisory, alarm and control equipment; pressure vessels; pumps; and high pressure/high capacity chlorine storage cylinders and equipment.

Safety standards may include relevant sections of Occupational Health and Safety legislation, enterprise safety rules, relevant state and federal legislation, national standards for plant and Australian standards.

Information and documentation sources may include verbal and written communications, enterprise/site safety rules documentation/form(s), enterprise/site operating instructions, enterprise/site log book, manufacturer operation and maintenance manuals, dedicated computer equipment, equipment and alarm manuals, enterprise standing instructions and plant notes.

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RANGE STATEMENT

Technical and operational indicators may include stimuli (audio, smell, touch, visual), remote or local indicators and recorders and alarms (visible and or audible)

Communications may be by means of telephone, two way radio, pager, computer (electronic mail), operating log (written or verbal) and public address system.

Tests may include stand-by plant tests and motor direction checks.

Appropriate personnel to consult, give or receive direction may include supervisor/team leader or equivalent, technical and engineering officers or equivalent, maintenance staff, power plant operations personnel or equivalent and other operating staff or equivalent.

Test, fault finding and operating tools may include hand and power tools, high voltage testers and proving dead equipment.

Operating environment may be, during inclement or otherwise harsh weather conditions, in wet/noisy/dusty/hot areas, during night periods, remote from plant or aided by indicators and monitors.

Faults and abnormal operating conditions may include motor/pump/ actuator/valve/damper failure/malfunctions, control equipment failure/ malfunctions, loss of electrical supply to plant and equipment, process chemical limits exceeded, process chemicals leaks/spillages, excessive vibration pumps/motors and high legionella bacteria count.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations.

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UEPOPS323B Operate and monitor reverse osmosis plant

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to operate, inspect and monitor reverse osmosis plant.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships.

Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

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Prerequisite Unit(s) **4)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Plan and prepare work	1.1	Safety issues are identified to comply with enterprise/site requirements
	1.2	Work requirements are identified from relevant personnel and documentation
	1.3	Documentation to determine plant status is assessed and evaluated
	1.4	Localised plant inspection and field preparation for service are carried out in accordance with manufacturer and enterprise procedures
	1.5	Plant operational pre-requisites are established in accordance with manufacturer and enterprise procedures
	1.6	Sequence for recommissioning of plant is determined to suit existing circumstances in accordance with enterprise/site requirements
	1.7	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2 Operate plant	2.1	Plant is operated in accordance with enterprise and manufacturer operating procedures
	2.2	Plant is monitored and observed to detect deviations from normal operating conditions
	2.3	Corrective actions taken to rectify abnormalities in accordance with manufacturer and enterprise procedures
	2.4	Plant to be removed from service is locally identified and removed from service in accordance with enterprise/site requirements
	2.5	Corrective actions are taken in accordance with enterprise safety rules and site requirements when abnormalities are identified during the removal from service

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ELEMENT		PERFORMANCE CRITERIA	
3	Test plant operation	3.1	Tests are performed in accordance with defined procedures applicable to the operational test
		3.2	Plant is observed for correct operational response
		3.3	Corrective action is taken when response is not in accordance with documentation, plant integrity or personnel safety requirements
		3.4	Plant is returned to required operational status upon completion of test
4	Analyse plant faults	4.1	Causes of abnormal plant operating conditions are identified by analysing the technical and operational information in a logical and sequential manner
		4.2	Corrective action taken is in accordance with enterprise/site procedures
		4.3	Plant integrity and personnel safety is maintained through consultation with appropriate personnel, and reference to plant, technical and operational documentation
5	Monitor and inspect plant	5.1	Plant to be monitored/inspected is physically identified
		5.2	Plant is monitored/inspected for normal operation or to detect deviations
		5.3	Corrective action taken is in accordance with enterprise/site procedures
		5.4	Appropriate personnel are notified when defects are detected
6	Complete documentation	6.1	Documentation is updated and plant problems, movements, abnormalities and status are reported and logged in accordance with enterprise/site procedures

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of operating and monitoring reverse osmosis plants.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO323B Reverse osmosis plant

Evidence shall show that knowledge has been acquired for safe working practices of

T1 Relevant Environmental, Occupational Health and Safety legislation and regulation

T2 Enterprise procedures

T3 Plant drawings and manufacturers manuals

T4 Introduction to and typical arrangements of power production plant

T5 Relevant plant and equipment, its location and operating parameters

T6 Electric motor types and characteristics

T7 Pump and compressor types and characteristics

T8 Valve, damper and actuator types and characteristics

T9 Switchgear types and characteristics

T10 Electrical protection types and characteristics

T11 Water chemistry

T12 Relevant chemicals, uses and hazards

T13 Fundamentals of water treatment

T14 Water treatment plants, types and characteristics

T15 Plant status

T16 Control and data acquisition systems

T17 Lubrication and bearings

T18 Electrical fundamentals

KS02-PO323B Reverse osmosis plant

Specific skills needed to achieve the Performance Criteria:

T1 Interpret plant drawings and manufacturers manuals

T2 Apply enterprise recording procedures

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REQUIRED SKILLS AND KNOWLEDGE

T3 Identify plant status

T4 Prepare plant/equipment for operation

T5 Organise resources

T6 Operate reverse osmosis plant

T7 Apply diagnostic and testing techniques

T8 Identify and respond to abnormal plant operating conditions

T9 Plan and prioritise work

T10 Use relevant hand tools

T11 Communicate effectively

T12 Apply data analysis techniques and tools.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment	**9.1)**
	Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

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Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement

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- Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
- Demonstrate an appropriate level of employability skills
- Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures

- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Preparation and planning of work
  - Operation of reverse osmosis plant
  - Operationally testing plant
  - Analysing plant faults
  - Monitoring plant operation
  - Knowledge of the properties of gases, their use and precautions to be taken
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment',

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evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment

9.4)

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note: Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the unit of competency as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Systems, plant and/or equipment may include electrical supply switchboard(s) and transformers; reverse osmosis membranes and pressure vessels; electrical motors; pumps; valves, actuators and dampers (electric, hydraulic, pneumatic and manual); safety showers and eyewash equipment; lime, ferric chloride storage and delivery plant; high pressure/high capacity chlorine storage cylinders and associated delivery

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RANGE STATEMENT

equipment; high capacity sulphuric acid storage tanks and associated delivery equipment; safety shower and eyewash equipment; and supervisory, protection and alarm and control equipment.

Safety standards may include relevant sections of Occupational Health and Safety legislation, enterprise safety rules, relevant state and federal legislation, national standards for plant and Australian standards.

Information and documentation sources may include verbal and written communications, enterprise/site safety rules documentation/form(s), enterprise/site operating instructions, enterprise/site log book, manufacturer operation and maintenance manuals, dedicated computer equipment, equipment and alarm manuals and enterprise standing instructions and plant notes.

Technical and operational indicators may include stimuli (audio, smell, touch, visual), remote or local indicators and recorders and alarms (visible and/or audible).

Communications may be by means of telephone, two way radio, pager, computer (electronic mail) and operating log (written or verbal).

Tests may include stand-by plant “cut-in” tests, motor direction checks and plant performance tests.

Appropriate personnel to consult, give or receive direction may include supervisor/team leader or equivalent, technical and engineering officers or equivalent, maintenance staff, power plant operations personnel or equivalent, other operating staff or equivalent and contractor staff.

Test, fault finding and operating tools may include high voltage testers, providing dead equipment, power or hand tools, pH and conductivity meters and chlorine leak detectors.

Operating environment may be remote from plant, aided by indicators and monitors, during inclement or otherwise harsh weather conditions, in wet/noisy/ dusty/hot areas or during continuous operation.

Faults and abnormal operating conditions may include motor/pump/ actuator/valve/damper failure/malfunctions, control equipment failure/ malfunctions, loss of electrical supply to plant and equipment, process chemical limits exceeded and process chemicals leaks/spillages, excessive vibration pumps/motors.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

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Competency Field

Competency Field **11)**

Operations.

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UEPOPS324B Operate and monitor brine concentrator plant

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to operate, inspect and monitor of brine concentrator plant.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships.

Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

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Prerequisite Unit(s) **4)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Plan and prepare work	1.1	Safety issues are identified to comply with enterprise/site requirements
	1.2	Work requirements are identified from relevant personnel and documentation
	1.3	Documentation to determine plant status is assessed and evaluated
	1.4	Localised plant inspection and field preparation for service are carried out in accordance with manufacturer and enterprise procedures
	1.5	Plant operational pre-requisites are established in accordance with manufacturer and enterprise procedures
	1.6	Sequence for recommissioning of plant is determined to suit existing circumstances in accordance with enterprise/site requirements
	1.7	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2 Operate plant	2.1	Plant is operated in accordance with enterprise and manufacturer operating procedures
	2.2	Plant is monitored and observed to detect deviations from normal operating conditions
	2.3	Corrective actions taken to rectify abnormalities in accordance with manufacturer and enterprise procedures
	2.4	Plant to be removed from service is locally identified and removed from service in accordance with enterprise/site requirements
	2.5	Corrective actions are taken in accordance with enterprise safety rules and site requirements when abnormalities are identified during the removal from service

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ELEMENT		PERFORMANCE CRITERIA	
3	Test plant operation	3.1	Tests are performed in accordance with defined procedures applicable to the operational test
		3.2	Plant is observed for correct operational response
		3.3	Corrective action is taken when response is not in accordance with documentation, plant integrity or personnel safety requirements
		3.4	Plant is returned to required operational status upon completion of test
4	Analyse plant faults	4.1	Cause of abnormal plant operating conditions are identified by analysing the technical and operational information in a logical and sequential manner
		4.2	Corrective action taken is in accordance with enterprise/site procedures
		4.3	Plant integrity and personnel safety is maintained through consultation with appropriate personnel, and with reference to plant, technical and operational documentation
5	Monitor and inspect plant	5.1	Plant to be monitored/inspected is physically identified
		5.2	Plant is monitored/inspected for normal operation or to detect deviations
		5.3	Corrective action taken is in accordance with enterprise/site procedures
6	Complete documentation	6.1	Documentation is updated and plant problems, movements, abnormalities and status are reported and logged in accordance with enterprise/site procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this

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REQUIRED SKILLS AND KNOWLEDGE

unit.

Evidence shall show that knowledge has been acquired of operating and monitoring brine concentrator plants.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO324B Brine concentrator plant

Evidence shall show that knowledge has been acquired for safe working practices of:

T1 Relevant Environmental, Occupational Health and Safety legislation and regulations

T2 Enterprise procedures

T3 Plant drawings and manufacturers manuals

T4 Introduction to and typical arrangements of power production plant

T5 Relevant plant and equipment, its location and operating parameters

T6 Electric motor types and characteristics

T7 Pump and compressor types and characteristics

T8 Valve, damper and actuator types and characteristics

T9 Switchgear types and characteristics

T10 Electrical protection types and characteristics

T11 Water chemistry

T12 Relevant chemicals, uses and hazards

T13 Fundamentals of water treatment

T14 Plant status

T15 Enterprise recording procedures

T16 Control and data acquisition systems

T17 Lubrication and bearings

T18 Electrical fundamentals

T19 Auxiliary supply systems

T20 High voltage systems

T21 Safe operating principles

KS02-PO324B Brine concentrator plant

Specific skills needed to achieve the Performance Criteria:

T1 Interpret plant drawings and manufacturers manuals

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REQUIRED SKILLS AND KNOWLEDGE

T2 Apply enterprise recording procedures

T3 Identify plant status

T4 Prepare plant/equipment for operation

T5 Organise resources

T6 Operate brine concentrator plant

T7 Apply diagnostic and testing techniques

T8 Identify and respond to abnormal plant operating conditions

T9 Plan and prioritise work

T10 Use relevant hand tools

T11 Communicate effectively

T12 Apply data analysis techniques and tools.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

9.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord

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with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as

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specified in the Performance Criteria and Range Statement
    - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
    - Demonstrate an appropriate level of employability skills
    - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
    - Knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
    - Preparation and planning of work
    - Operation of brine concentrator plant
    - Operationally testing plant
    - Analysing plant faults
    - Monitoring plant operation
    - Knowledge of the properties of gases, their use and precautions to be taken
    - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

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In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment

9.4)

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note: Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the unit of competency as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Systems, plant and/or equipment may include electric boiler and associated auxiliaries; electrical supply switchboard(s) and transformers; vapour compressor; centrifuges; electrical motors; valves, actuators and dampers (electric, hydraulic, pneumatic and manual); supervisory, protection alarm and control equipment; safety

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showers and eyewash equipment; pumps; heat exchangers; de-aerator; and process chemicals storage and handling equipment.

Safety standards may include relevant sections of Occupational Health and Safety legislation, enterprise safety rules, relevant state and federal legislation, national standards for plant and Australian standards.

Information and documentation sources may include verbal and written communications, enterprise/site safety rules documentation/form(s), enterprise/site operating instructions, enterprise/site log book, manufacturer operation and maintenance manuals, dedicated computer equipment, equipment and alarm manuals, enterprise standing instructions and plant notes.

Technical and operational indicators may include stimuli (audio, smell, touch, visual), remote or local indicators and recorders and alarms (visible and or audible).

Communications may be by means of telephone, two way radio, pager, computer (electronic mail), operating log (written or verbal) and public address system.

Tests may include stand-by plant “cut-in” tests and motor direction checks.

Appropriate personnel to consult, give or receive direction may include supervisor/team leader or equivalent, technical and engineering officers or equivalent, maintenance staff, power plant operations personnel or equivalent, other operating staff or equivalent and contractor staff.

Test, fault finding and operating tools may include high voltage testers, providing dead equipment, power or hand tools and pH meters.

Operating environment may be, remote from plant, aided by indicators and monitors, during inclement or otherwise harsh weather conditions, wet/noisy/dusty/ hot areas and during continuous operation.

Faults and abnormal operating conditions may include motor/pump/ actuator/valve/ damper failure/malfunctions, control equipment failure/ malfunctions, loss of electrical supply to plant and equipment, process chemical limits exceeded, process chemicals leaks/spillages and excessive vibration pumps/motors.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

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Competency Field

Competency Field **11)**

Operations.

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UEPOPS325B Operate and monitor water quality monitoring systems

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This competency standard unit deals with the skills and knowledge required to operate and monitor water quality monitoring systems in a power station. These systems include all analytical devices used to monitor process chemical conditions.

Application of the Unit

Application of the Unit **2)**

This competency standard unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practice in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the

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Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Plan and prepare work	1.1	Safety issues are identified to comply with enterprise/site requirements
	1.2	Work requirements are identified from relevant personnel and documentation
	1.3	Documentation to determine plant status is assessed and evaluated
	1.4	Localised device inspection is carried out in accordance with manufacturer's and enterprise procedures
	1.5	Device operational pre-requisites are established in accordance with manufacturer's and enterprise procedures
	1.6	Sequence for recommissioning of device is determined to suit existing circumstances in accordance with enterprise/site requirements
	1.7	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2 Operate device	2.1	Devices are operated in accordance with enterprise and manufacturer's operating procedures
	2.2	Devices are monitored and observed to detect deviations from normal operating conditions
	2.3	Corrective actions taken to rectify abnormalities in accordance with manufacturer's and enterprise procedures
3 Test device operation	3.1	Tests are performed in accordance with defined procedures applicable to the operational test
	3.2	Devices are observed for correct operational

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ELEMENT		PERFORMANCE CRITERIA	
			response
		3.3	Devices are returned to required operational status upon completion of test
4	Analyse plant conditions	4.1	Cause of abnormal plant conditions are identified by analysing the technical and operational information in a logical and sequential manner
		4.2	Corrective action is taken when response is not in accordance with documentation, plant integrity or personnel safety requirements
		4.3	Plant integrity and personnel safety is maintained through consultation with appropriate personnel, and reference to plant, technical and operational documentation
5	Monitor and inspect plant	5.1	Plant to be monitored/inspected is physically identified
		5.2	Plant is monitored/inspected for normal operation or to detect deviations
		5.3	Corrective action taken is in accordance with enterprise/site procedures
		5.4	Appropriate personnel are notified when defects are detected
6	Complete documentation	6.1	Documentation is updated and plant problems, movements, abnormalities and status are reported and logged in accordance with enterprise/site procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) Essential Knowledge and Associated Skills (EKAS): This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of operating and monitoring water quality control systems for a permit to work.

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REQUIRED SKILLS AND KNOWLEDGE

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO325B Water quality monitoring systems

Evidence shall show that knowledge has been acquired for safe working practices of:

T1 Relevant Environmental, Occupational Health and Safety legislation and regulations

T2 Enterprise procedures

T3 Plant drawings and manufacturers manuals

T4 Introduction to and typical arrangements of power production plant

T5 Relevant plant and equipment, its location and operating parameters

T6 Plant status

T7 Control and data acquisition systems

T8 Electric motor types and characteristics

T9 Pump and compressor types and characteristics

T10 Valve and actuator types and characteristics

T11 Switchgear types and characteristics

T12 Relevant chemicals, uses and hazards

T13 Fundamentals of water treatment

T14 Water treatment plants, types and characteristics

T15 Water analysing equipment types and characteristics

T16 Water dosing systems

T17 Water chemical additives and effects

T18 Water systems types and characteristics

T19 Relevant water quality standards

T20 Process chemicals and their properties

T21 Material safe handling data sheets

T22 General responsibilities for power production plant operations

T23 Electrical principles

KS02-PO325B Water quality monitoring systems

Specific skills needed to achieve the performance criteria:

T1 Interpret plant drawings and manufacturers manuals

T2 Apply enterprise recording procedures

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REQUIRED SKILLS AND KNOWLEDGE

T3 Identify plant status

T4 Prepare plant/equipment for operation

T5 Organise resources

T6 Operate water quality monitoring systems

T7 Apply diagnostic and testing techniques

T8 Identify and respond to abnormal plant operating conditions

T9 Apply enterprise recording procedures

T10 Identify plant status

T11 Prepare plant/equipment for operation

T12 Organise resources

T13 Operate water quality monitoring systems

T14 Apply diagnostic and testing techniques

T15 Identify and respond to abnormal plant operating conditions

T16 Plan and prioritise work

T17 Use relevant hand tools

T18 Communicate effectively

T19 Apply data analysis techniques and tools

Evidence Guide

EVIDENCE GUIDE

9) Evidence Guide: This provides essential advice for assessment of the unit of competency and must be read in conjunction with the performance criteria and the range statement of the unit of competency and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment	**9.1)**
	Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that

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can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated performance criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP05". Evidence shall also comprise:

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- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the performance criteria and range and
  - Apply sustainable energy principles and practices as specified in the performance criteria and range and
  - Demonstrate an understanding of the essential knowledge and associated skills as described in Essential Knowledge and Associated Skills of this unit and
  - Demonstrate an appropriate level of employability skills and
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures and
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Preparation and planning of work
  - Operation of water quality control systems
  - Operationally testing plant
  - Analysing plant faults
  - Monitoring plant operation
  - Knowledge of process chemicals, their use and precautions taken
  - Knowledge of water quality chemistry
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a

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workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this competency standard unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and method and in a variety of environments.

Method of assessment **9.4)**

This competency standard unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this competency standard unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

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Nil

Range Statement

RANGE STATEMENT

10) Range: This relates to the unit of competency as a whole providing the range of contexts and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

Chemical conditions monitored and operated may include pH, conductivity, acid conductivity, silica, dissolved O2, ammonia, totally dissolved solids, phosphate, oxidisation reduction potential, sodium ion and chlorine residual.

Systems, plant and/or equipment may include raw water, feed water, condenser cooling water, auxiliary cooling water, demineralised water, water treatment plant, water quality room, ammonia and hydrazine systems, hypochlorite plant, effluent disposal system, reverse osmosis plant pumps, high/low pressure, characteristics, operating conditions valves, actuators (electric, pneumatic) electrical supply switchboards electrical motors (high and low voltage) supervisory, alarm and control equipment filters, strainers, dryers, moisture, pressure control devices, safety devices and high and low pressure systems.

Safety standards may include relevant sections of Occupational Health and Safety legislation, enterprise safety rules, relevant state and federal legislation and national standards for plant.

Information and documentation sources may include verbal or written communications enterprise safety rules documentation/form(s) equipment and alarm manuals dedicated computer equipment enterprise/site standing and operating instructions enterprise log books and manufacturer’s operation and maintenance manuals.

Technical and operational indicators may include stimuli (audio, smell, touch, visual), local indicators and recorders and alarms (visible and/or audible).

Communications may be by means of telephone, two way radio, pager, public address system, computer (electronic mail) and operating log (written or verbal).

Tests may include stand-by plant tests and post maintenance operating tests.

Appropriate personnel to consult, give or receive direction may include, supervisor/team leader or equivalent, technical and engineering officers or equivalent, maintenance staff, power plant operations personnel and contractor and specialist staff.

Test, fault finding and operating tools may include chemical analysis equipment, power or hand tools, control system equipment and leak test equipment.

Operating environment may be remote from plant, aided by indicators and monitors, during inclement or otherwise harsh weather conditions, in wet/noisy/dusty areas or

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RANGE STATEMENT

during night periods.

Faults and abnormal operating conditions may include motor/pump/ actuator/valve/damper failure/malfunctions, control equipment failure/ malfunctions, loss of electrical supply to plant and equipment, loss supply, low water pressure, burst pipes, plant/equipment, loss of major auxiliary (dosing plant) and loss of station air supply.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations.

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UEPOPS326B Operate and monitor oil systems

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to operate, monitor and inspect oil systems.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships.

Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

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Prerequisite Unit(s) **4)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Plan and prepare work	1.1	Safety issues are identified to comply with enterprise/site and legislative requirements
	1.2	Work requirements are identified from relevant personnel and documentation
	1.3	Documentation to determine plant status is assessed and evaluate
	1.4	Localised plant inspection, pre-operational checks and field preparations for service are carried out in accordance with manufacturer and enterprise/site procedures
	1.5	Plant operational pre-requisites are established in accordance with manufacturer and enterprise/site procedures
	1.6	Sequence for recommissioning of plant is determined to suit existing circumstances in accordance with enterprise/site requirements
	1.7	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2 Operate plant	2.1	Plant is operated in accordance with enterprise and manufacturer operating procedures
	2.2	Plant is monitored and observed to detect deviations from normal operating conditions
	2.3	Corrective actions taken or reported, to rectify abnormalities are in accordance with industry standards and site requirements
	2.4	Plant is removed from service in accordance with enterprise and site requirements
	2.5	Corrective actions are taken in accordance with enterprise safety rules and site requirements when abnormalities are identified during the removal from service

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ELEMENT	PERFORMANCE CRITERIA	
3 Test plant operation	3.1	Tests are performed in accordance with defined procedures applicable to the operational test
	3.2	Plant is observed for correct operational response
	3.3	Corrective action is taken when response is not in accordance with documentation, plant integrity or personnel safety requirements
	3.4	Plant is returned to required operational status upon completion of test
4 Analyse plant faults	4.1	Causes of abnormal plant operating conditions are identified by analysing the technical and operational information in a logical and sequential manner
	4.2	Corrective action taken is in accordance with company procedures
	4.3	Plant integrity and personnel safety is maintained through consultation with appropriate personnel, and reference to plant, technical and operational documentation
5 Monitor and inspect plant	5.1	Plant to be monitored/inspected is physically identified
	5.2	Plant is monitored/inspected for expected operation or to detect deviations from normal operating conditions of the plant
	5.3	Corrective action taken is in accordance with enterprise/site procedures
	5.4	Appropriate personnel are notified when defects are detected
6 Complete documentation	6.1	Documentation is updated and plant problems, movements, and abnormalities and status are reported and logged in accordance with enterprise/site procedures

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of operating and monitoring oil systems.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO326B Oil systems

Evidence shall show that knowledge has been acquired for safe working practices of:

T1 Relevant Environmental, Occupational Health and Safety legislation and regulations

T2 Enterprise procedures

T3 Plant drawings and manufacturers manuals

T4 Introduction to and typical arrangements of power production plant

T5 Relevant plant and equipment, its location and operating parameters

T6 Electric motor types and characteristics

T7 Pump and compressor types and characteristics

T8 Valve, damper and actuator types and characteristics

T9 Switchgear types and characteristics

T10 Electrical protection types and characteristics

T11 Properties of oils

T12 Oil systems types and characteristics

T13 Oil cooling systems, types and characteristics

T14 Plant status

T15 Supervisory, alarm, protection and control equipment

T16 Oil conditioning equipment, types and characteristics

T17 Lubrication and bearings

T18 Electrical fundamentals

KS02-PO326B Oil systems

Specific skills needed to achieve the Performance Criteria:

T1 Interpret plant drawings and manufacturers manuals

T2 Apply enterprise recording procedures

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REQUIRED SKILLS AND KNOWLEDGE

T3 Identify plant status

T4 Prepare plant/equipment for operation

T5 Organise resources

T6 Operate oil systems

T7 Apply diagnostic and testing techniques

T8 Identify and respond to abnormal plant operating conditions

T9 Plan and prioritise work

T10 Use relevant hand tools

T11 Communicate effectively

T12 Apply data analysis techniques and tools

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment	**9.1)**
	Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

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Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement

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- Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
- Demonstrate an appropriate level of employability skills
- Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures

- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Preparation and planning of work
  - Operation of operation of oil system
  - Operationally testing plant
  - Analysing plant faults
  - Monitoring plant operation
  - Knowledge of the properties of gases, their use and precautions to be taken
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment’,

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evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment

9.4)

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines..

Note: Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the unit of competency as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Systems, plant and/or equipment may include electrical supply switchboards, electrical motors, valves and actuators (electric, hydraulic, pneumatic and manual), supervisory, protection, alarm and control equipment, cooling water plant and equipment, filters, strainers, moisture removal devices, pressure control devices, safety devices, high and low pressure systems, pumps (motor, shaft or steam driven);

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RANGE STATEMENT

oil systems may include lubricating and hydraulic and seal oil systems.

Safety standards may include relevant sections of Occupational Health and Safety legislation, enterprise safety rules, relevant state and federal legislation, national standards for plant and Australian standards.

Information and documentation sources may include verbal or written communications; enterprise safety rules documentation; dedicated computer equipment; enterprise/site standing and operating instructions; enterprise log books; manufacturer operation and maintenance manuals; and equipment and alarm manuals.

Technical and operational indicators may include stimuli (audio, smell, touch, visual), remote or local indicators and recorders, computers and alarms (visible and or audible).

Communications may be by means of telephone, two way radio, pager, computer (electronic mail), operating log (written or verbal) and public address system.

Tests may include stand-by plant “cut-in” tests, motor direction checks and performance tests.

Appropriate personnel to consult, give or receive direction may include supervisor/team leader or equivalent, power plant operations personnel or equivalent, technical and engineering officers or equivalent, maintenance staff and contractor staff.

Test, fault finding and operating tools may include high voltage testers, proving dead equipment, power or hand tools.

Operating environment may be during inclement or otherwise harsh weather conditions, in wet/noisy/dusty/hot areas or during continuous operation.

Faults and abnormal operating conditions may include motor/pump/ actuator/valve/ dampers failure/malfunctions, control equipment failure/ malfunctions, loss of electrical supply to plant and equipment, loss/low cooling air/water, lubricating flow to plant/equipment, high pressure/temperature, oil leaks, oil contamination, high oil strainer/filter dp, moisture removal plant and equipment malfunctions and excessive vibration pumps/motors.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1.00 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

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Competency Field

Competency Field **11)**

Operations.

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UEPOPS327B Monitor and maintain civil assets

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to monitor and conduct remedial maintenance required to ensure the integrity of civil assets encountered within the hydro-electric generating system.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships.

Pre-Requisites

Prerequisite Unit(s) **4)**

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Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT		PERFORMANCE CRITERIA	
1	Plan and Prepare for the Work	1.1	Occupational Health and Safety standards, statutory requirements, relevant Australian standards, codes of practice, manufacturer specifications, environmental requirements and enterprise procedures are identified, applied and monitored throughout the work procedure.
		1.2	Work requirements are identified from request/works orders or equivalent and clarified/confirmed with appropriate parties or by site inspection.
		1.3	Resources required to satisfy the work are identified, obtained and inspected for compliance in accordance with enterprise procedures.
		1.4	Potential hazards are identified and prevention and/or control measures are selected in accordance with the work plan and site procedures.
		1.5	Work is planned in detail including sequencing and prioritising and considerations made, where appropriate, for maintenance of plant security and capacity in accordance with system/site requirements
		1.6	Co-ordination requirements, including requests for isolations where appropriate, are resolved with others involved, affected or required by the work
2	Monitor Civil assets	2.1	Monitoring frequencies of assets are determined in accordance with enterprise/site requirements.
		2.2	Check lists are maintained in accordance with enterprise/site requirements.
		2.3	Deficiencies and/or unusual events/conditions are reported to appropriate personnel in accordance with enterprise/site requirements.
3	Maintain Civil assets	3.1	Maintenance of civil assets is undertaken in

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ELEMENT	PERFORMANCE CRITERIA	
		accordance with site requirements and local conditions.
	3.2	Appropriate tools, equipment or plant required to maintain assets is utilised in accordance with manufacturer specifications and job requirements.
4 Complete the work	4.1	Work is completed and appropriate personnel notified in accordance with enterprise/site requirements.
	4.2	Work area is cleared of waste, cleaned, restored and secured in accordance with enterprise/site requirements
	4.3	Tools and equipment are maintained in accordance with manufacturer specifications and enterprise/site procedures.
	4.4	Work completion details are finalised in accordance with enterprise/site procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of monitoring and maintaining civil assets.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO327B Civil assets

Evidence shall show that knowledge has been acquired for safe working practices of:

T1 Relevant Environmental, Occupational Health and Safety legislation and regulations

T2 Enterprise procedures

T3 Plant drawings and manufacturers manuals

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REQUIRED SKILLS AND KNOWLEDGE

T4 Introduction to and typical arrangements of hydroelectric generation plant

T5 Headgate, tailgate, intake, penstock, tunnels and tail races, types and characteristics

T6 Dam, types and characteristics

T7 Principles of hydro electric generation

T8 General layout of work site and associated assets

T9 Relevant monitoring and maintenance procedures and techniques

T10 Lifting equipment and techniques, surface preparation and treatment techniques

T11 Communication equipment and operating procedures.

KS02-PO327B Civil assets

Specific skills needed to achieve the Performance Criteria:

T1 Interpret plant drawings and manufacturers manuals

T2 Apply monitoring and maintenance procedures

T3 Identify and select equipment and materials for the job

T4 Use and portable power tools

T5 Use relevant lifting and load shifting equipment

T6 Perform equipment user maintenance

T7 Store and maintain tools and equipment

T8 Communicate effectively.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment	**9.1)**

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Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much (and in what detail) the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with

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the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Preparation of planning of work
  - Monitoring of civil assets.
  - Maintenance of civil assets.
  - Completion of work procedures
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials

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to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note: Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

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RANGE STATEMENT

10) This relates to the unit of competency as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Civil assets may include dams, canals/flumes, tail race, intake structures, outlet structures, regulating structures, pen stocks, pipelines, syphons, rising mains, tunnels, pumping stations, access roads, fencing, other relevant buildings.

Safety standards may include relevant sections of Occupational Health and Safety legislation, enterprise safety rules, relevant state and federal legislation, local by-laws, environmental requirements, relevant licensing requirements for tools and mobile plant.

Communications may be by means of telephone, fax, two-way radio, dedicated computer equipment, logs, verbal.

Appropriate personnel to consult, give or receive direction may include power plant operator/system controllers or equivalent, technical and engineering officers or equivalent, maintenance staff, other authorities, contractors, general public.

Tools and equipment may include lifting equipment, cranes, hoists, mobile plant, four wheel drive vehicles, earth moving equipment, trash rakes, power tools, chainsaws, boats, hand tools, fire suppression equipment.

Extreme and varied weather conditions may be encountered, including snow, freezing rain, high winds and flooding.

Work completion details may include enterprise recording procedures (electronic or hard copy).

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations.

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UEPOPS328B Undertake dam safety surveillance

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to conduct ongoing surveillance of water storage facilities to ensure structural integrity and water quality is maintained.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships.

Pre-Requisites

Prerequisite Unit(s) **4)**

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Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT		PERFORMANCE CRITERIA	
1	Plan and Prepare for the Work	1.1	Occupational Health and Safety standards, statutory requirements, relevant Australian standards, codes of practice, manufacturer specifications, environmental requirements and enterprise procedures are identified, applied and monitored throughout the work procedure.
		1.2	Work requirements are identified from request/works orders or equivalent and clarified/confirmed with appropriate parties or by site inspection.
		1.3	Resources required to satisfy the work are identified, obtained and inspected for compliance in accordance with enterprise procedures.
		1.4	Potential hazards are identified and prevention and/or control measures are selected in accordance with the work plan and site procedures.
		1.5	Work is planned in detail including sequencing and prioritising and considerations made, where appropriate, for maintenance of plant security and capacity in accordance with system/site requirements.
		1.6	Co-ordination requirements, including requests for isolations where appropriate, are resolved with others involved, affected or required by the work.
2	Undertake dam safety surveillance	2.1	Surveillance of dam structures is undertaken in accordance with site/enterprise procedures and guidelines.
		2.2	Recordings of leakage are reported to appropriate authorities in accordance with site/enterprise procedures.
		2.3	Special inspections are undertaken following abnormal events in accordance with enterprise procedures.

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ELEMENT	PERFORMANCE CRITERIA
3 Sample and record water quality	3.1 Water samples are collected using appropriate equipment and techniques in accordance with site/enterprise procedures.
	3.2 Perform basic testing using laboratory and/or field equipment in accordance with enterprise/site requirements.
	3.3 Test results are recorded and abnormal results are communicated to appropriate personnel in accordance with site/enterprise requirements.
4 Complete the work	4.1 Documentation is updated in accordance with enterprise procedures.
	4.2 Test equipment/tools is/are maintained and stored in accordance with enterprise procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of undertaking dam safety surveillance.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO328B Dam safety surveillance

Evidence shall show that knowledge has been acquired for safe working practices of:

T1 Relevant Environmental, Occupational Health and Safety legislation and regulations

T2 Enterprise procedures

T3 Plant drawings and manufacturers manuals

T4 Introduction to and typical arrangements of hydroelectric generation plant

T5 General layout of work site and associated equipment

T6 Early warning signs and causes of dam failures

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REQUIRED SKILLS AND KNOWLEDGE

T7 Dams, types and characteristics

T8 Water chemistry

T9 Water sampling procedures, recording procedures

T10 Communication equipment and principles.

KS02-PO328B Dam safety surveillance

Specific skills needed to achieve the Performance Criteria:

T1 Interpret plant drawings and manufacturers manuals

T2 Select and utilise equipment and materials required to perform the work

T3 Recognise work site and relevant associated equipment

T4 Identify early warning signs and causes of dam failures

T5 Undertake water sampling and recording procedures

T6 Communicate effectively.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full

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can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement

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- Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
- Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
- Demonstrate an appropriate level of employability skills
- Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures

- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Preparation of planning of work
  - Surveillance of hydro electric dams and associated equipment
  - Basic testing and taking of water samples.
  - Completion of work procedures.
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces,

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with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note: Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the unit of competency as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Work in this unit is typically carried out under general guidance.

Surveillance sites may include earthen walls, concrete walls, spillways, reservoir perimeter, weirs, tunnels and galleries.

Samples may be taken form dams, rivers, weirs and water conveyance assets and equipment, and testing may be pollution, pH, turbidity.

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RANGE STATEMENT

Recordings may be in the form of log sheets or through electronic media.

Dam safety surveillance will mostly be of a visual nature but not necessarily limited to such.

Appropriate personnel may include hydro station operating staff, local councils, irrigation concerns, control centres, maintenance staff, emergency services personnel, downstream landowners.

Abnormal events may include floods, landslides and earthquakes.

Communication may be by means of telephone/fax, two way radio, logs, verbal.

Extreme weather conditions may be encountered over varied terrain requiring the use of 4WD vehicles.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations.

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UEPOPS329B Operate and monitor auxiliary steam systems

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to operate, inspect and monitor auxiliary steam systems in a power station.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships.

Pre-Requisites

Prerequisite Unit(s) **4)**

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Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Plan and prepare work	1.1	Safety issues are identified to comply with enterprise/site and legislative requirements
	1.2	Work requirements are identified from relevant personnel and documentation
	1.3	Documentation to determine plant status is assessed and evaluate
	1.4	Localised plant inspection, pre-operational checks and field preparation for service are carried out in accordance with manufacturer and enterprise/site procedures
	1.5	Plant operational pre-requisites are established in accordance with manufacturer and enterprise/site procedures
	1.6	Sequence for recommissioning of plant is determined to suit existing circumstances in accordance with enterprise/site requirements
	1.7	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2 Operate plant	2.1	Plant is operated in accordance with enterprise and manufacturer operating procedures
	2.2	Plant is monitored and observed to detect deviations from normal operating conditions
	2.3	Corrective actions taken or reported, to rectify abnormalities are in accordance with industry standards and site requirements
3 Test plant operation	3.1	Tests are performed in accordance with defined procedures applicable to the operational test
	3.2	Plant is observed for correct operational response
	3.3	Corrective action is taken when response is not

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ELEMENT		PERFORMANCE CRITERIA	
			in accordance with documentation, plant integrity or personnel safety requirements
		3.4	Plant is returned to required operational status upon completion of test
4	Analyse plant faults	4.1	Causes of abnormal plant operating conditions are identified by analysing the technical and operational information in a logical and sequential manner
		4.2	Corrective action taken is in accordance with enterprise/site procedures
		4.3	Plant integrity and personnel safety is maintained through consultation with appropriate personnel, and reference to plant, technical and operational documentation
5	Monitor and inspect plant	5.1	Plant to be monitored/inspected is physically identified
		5.2	Plant is monitored/inspected for expected operation or to detect deviations from normal operating conditions of the plant
		5.3	Corrective action taken is in accordance with enterprise/site procedures
		5.4	Appropriate personnel are notified when defects are detected
6	Complete documentation	6.1	Documentation is updated and plant problems, movements, and abnormalities and status are reported and logged in accordance with enterprise/site procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of operating and monitoring

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REQUIRED SKILLS AND KNOWLEDGE

auxiliary steam systems.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO329B Auxiliary steam systems

Evidence shall show that knowledge has been acquired for safe working practices of:

T1 Relevant Environmental, Occupational Health and Safety legislation and regulations

T2 Enterprise procedures

T3 Plant drawings and manufacturers manuals

T4 Introduction to and typical arrangements of power production plant

T5 Relevant plant and equipment, its location and operating parameters

T6 Electric motor types and characteristics

T7 Pump and compressor types and characteristics

T8 Valve, damper and actuator types and characteristics

T9 Switchgear types and characteristics

T10 Electrical protection types and characteristics

T11 Relevant state and territory regulations

T12 Boiler steam/water cycle fundamentals

T13 Boiler steam/water auxiliary systems, types and characteristics

T14 Boiler drains and traps types and characteristics

T15 Plant status

T16 Enterprise recording procedures

T17 Control and data acquisition systems

T18 Thermodynamics

T19 Properties of matter

T20 Lubrication and bearings

KS02-PO329B Auxiliary steam systems

Specific skills needed to achieve the Performance Criteria:

T1 Interpret plant drawings and manufacturers manuals

T2 Apply relevant state and territory regulations

T3 Identify plant status

T4 Prepare plant/equipment for operation

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REQUIRED SKILLS AND KNOWLEDGE

T5 Organise resources

T6 Operate auxiliary steam systems

T7 Apply diagnostic and testing techniques

T8 Identify and respond to abnormal plant operating conditions

T9 Plan and prioritise work

T10 Use relevant hand tools

T11 Communicate effectively

T12 Apply data analysis techniques and tools

T13 Use diagrams, drawings and symbols

T14 Co-ordinate the operation of equipment to maintain plant integrity, personnel safety and continuity of supply.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord

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with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much (and in what detail) the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

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Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each Element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement OHS workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the Essential Knowledge and Associated Skills as described in 6) of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Preparation and planning of work
  - Operation of auxiliary steam systems
  - Operationally testing plant
  - Analysing plant faults
  - Monitoring plant operation
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items

Context of and specific resources for assessment **9.3)**

This unit should be assessed as it relates to normal work practice

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using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines..

Note: Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

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Range Statement

RANGE STATEMENT

10) This relates to the unit of competency as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Systems, plant and/or equipment may include auxiliary boiler; steam ranges; sootblowers; inerting steam; flash steam vessels, fuel oil systems; boiler drain system; deaeration; gland steam; air ejectors; turbine drains; feed heaters; deaerators; turbine flange heating; valves; actuators (electric, pneumatic, manual); electrical supply switchboards; electrical motors; supervisory, alarm, protection and control equipment; cooling water equipment; filters; pressure control devices; safety devices; and high and low pressure systems.

Safety standards may include relevant sections of Occupational Health and Safety legislation, enterprise safety rules, relevant state and federal legislation and national standards for plant.

Information and documentation sources may include verbal or written communications; enterprise/site safety rules documentation; dedicated computer equipment; enterprise/site standing and operating instructions; and enterprise/site log books.

Technical and operational indicators may include stimuli (audio, smell, touch, visual), remote or local indicators and recorders, computers and alarms (visible and or audible).

Communications may be by means of telephone, two way radio, pager, public address system, computers (electronic mail) and operating log (written or verbal).

Tests may include stand-by plant tests, post maintenance operating tests and alarm tests.

Appropriate personnel to consult, give or receive direction may include supervisor/team leader or equivalent, power plant operations personnel, technical and engineering officers or equivalent, maintenance staff, contractor personnel and power system control personnel or equivalent.

Test, fault finding and operating tools may include power or hand tools and steam detecting equipment.

Operating environment may be during inclement or otherwise harsh weather conditions, in wet/noisy/dusty areas or during night periods.

Faults and abnormal operating conditions may include motor/pump/ actuator/valve/dampers failure/malfunctions, control equipment failure/ malfunctions, loss of electrical supply to plant and equipment, excessive vibration pumps/motors, loss/low air , water, lubricating oil to plant/equipment, steam leaks, steam system faults/malfunctions, high filter/strainer differential pressure and excessive vibration pumps/motors.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The

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RANGE STATEMENT

definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations.

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UEPOPS330B Operate and monitor heat exchangers

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to operate and monitor heat exchangers / cooling systems within power stations.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships.

Pre-Requisites

Prerequisite Unit(s) **4)**

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Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Plan and prepare work	1.1	Safety issues are identified to comply with enterprise/site requirements
	1.2	Work requirements are identified from relevant personnel and documentation
	1.3	Documentation to determine plant status is assessed and evaluated
	1.4	Localised plant inspection and field preparation for service are carried out in accordance with manufacturer and enterprise procedures
	1.5	Plant operational pre-requisites are established in accordance with manufacturer and enterprise procedures
	1.6	Sequence for recommissioning of plant in accordance with enterprise requirements
	1.7	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2 Operate plant	2.1	Plant is operated in accordance with enterprise and manufacturer operating procedures
	2.2	Plant is monitored and observed to detect deviations from normal operating conditions
	2.3	Corrective actions taken to rectify abnormalities are in accordance with manufacturer and enterprise procedures
3 Test plant operation	3.1	Tests are performed in accordance with defined procedures applicable to the operational test
	3.2	Plant is observed for correct operational response
	3.3	Correct action is taken when response is not in accordance with documentation, plant integrity or personnel safety requirements

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ELEMENT		PERFORMANCE CRITERIA	
		3.4	Plant is returned to required operational status upon completion of test
4	Analyse plant faults	4.1	Causes of abnormal plant operating conditions are identified by analysing the technical and operational information in a logical and sequential manner
		4.2	Corrective action taken is in accordance with enterprise procedures
5	Monitor and inspect plant	5.1	Plant to be monitored/inspected is physically identified
		5.2	Plant is monitored/inspected for normal operation or to detect deviations
		5.3	Corrective action taken is in accordance with enterprise/site procedures
		5.4	Appropriate personnel are notified when defects are detected
6	Complete documentation	6.1	Documentation is updated and plant problems, movements, abnormalities and status are reported and logged in accordance with enterprise/site procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of operating and monitoring heat exchangers.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO330B Heat exchangers

Evidence shall show that knowledge has been acquired for safe working practices of:

T1 Relevant Environmental, Occupational Health and Safety legislation and

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REQUIRED SKILLS AND KNOWLEDGE

regulations

T2 Enterprise procedures

T3 Plant drawings and manufacturers manuals

T4 Introduction to and typical arrangements of power production plant

T5 Relevant plant and equipment, its location and operating parameters

T6 Valve, damper and actuator types and characteristics

T7 heat exchanger, types and characteristics

T8 Plant status

T9 Enterprise recording procedures

T10 Computers and software; Supervisory, alarm, protection and control equipment

KS02-PO330B Heat exchangers

Specific skills needed to achieve the Performance Criteria:

T1 Interpret plant drawings and manufacturers manuals

T2 Apply enterprise recording procedures

T3 Identify plant status

T4 Prepare plant/equipment for operation

T5 Organise resources

T6 Operate cooling system

T7 Apply diagnostic and testing techniques

T8 Identify and respond to abnormal plant operating conditions

T9 Plan and prioritise work

T10 Use relevant hand tools

T11 Communicate effectively

T12 Apply data analysis techniques and tools

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and

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EVIDENCE GUIDE

shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate **9.2)**

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competency in this unit

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Preparation and planning of work
  - Operation of cooling systems
  - Operationally testing plant
  - Analysing plant faults
  - Monitoring plant operation
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items

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Context of and specific resources for assessment **9.3)**

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines..

Note: Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

There are no recommended concurrent assessments with this unit,

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however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the unit of competency as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Systems, plant and/or equipment may include hydrogen coolers; oil coolers; general cooling water coolers; distilled water coolers; seal oil coolers; auxiliary cooling water; stator cooling; stator cable cooling; air cooling systems; condenser cleaning systems; radiators; valves and actuators (electric, hydraulic, pneumatic, manual); supervisory, protection, alarm and control equipment; transformer cooling systems; and refrigerating systems.

Safety standards may include relevant sections of Occupational Health and Safety legislation, enterprise safety rules, relevant state and federal legislation and national standards for plant.

Information and documentation sources may include verbal and written communications, enterprise/site safety rules documentation/form(s), enterprise/site standing and operating instructions, enterprise/site log book, manufacturer operation and maintenance manuals and dedicated computer equipment.

Technical and operational indicators may include stimuli (audio, smell, touch, visual), remote or local indicators and recorders, computers and alarms (visible and or audible).

Communications may be by means of telephone, two way radio, pager, public address system, computer (electronic mail), operating log (written or verbal), whistle or hand signal.

Tests may include alarm tests, stand-by plant test and post maintenance operating tests.

Appropriate personnel to consult, give or receive direction may include supervisor/team leader or equivalent, power system control personnel or equivalent, technical and engineering officers or equivalent, contractor and specialist personnel, maintenance staff and power plant operations personnel.

Test, fault finding and operating tools may include hand and power tools and cooling medium detecting equipment.

Operating environment may be, during inclement or otherwise harsh weather conditions, wet/noisy/dusty/hot areas or during continuous operation.

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RANGE STATEMENT

Faults and abnormal operating conditions may include motor/pump/ actuator/valve/ dampers failure/malfunctions, control equipment failure/ malfunctions, loss of electrical supply to plant and equipment, loss/low air, water, lubricating oil to plant/equipment, cooling medium system faults/malfunctions, cooling medium leaks, high filter/strainer dp and excessive vibration pumps/motors.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations.

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UEPOPS331B Operate and monitor water systems (condensate and feedwater)

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to operate, inspect and monitor the condensation and feedwater system.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships.

Pre-Requisites

Prerequisite Unit(s) **4)**

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Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Plan and prepare work	1.1	Safety issues are identified to comply with enterprise/site and legislative requirements
	1.2	Work requirements are identified from relevant personnel and documentation
	1.3	Documentation to determine plant status is assessed and evaluate
	1.4	Localised plant inspection, pre operational checks and field preparation for service are carried out in accordance with manufacturer and enterprise/site procedures
	1.5	Plant operational pre-requisites are established in accordance with manufacturer and enterprise/site procedures
	1.6	Sequence for recommissioning of plant is determined to suit existing circumstances in accordance with enterprise/site requirements
	1.7	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2 Operate plant	2.1	Plant is operated in accordance with enterprise and manufacturer operating procedures
	2.2	Plant is monitored and observed to detect deviations from normal operating conditions
	2.3	Corrective actions taken or reported, to rectify abnormalities are in accordance with industry standards and site requirements
3 Test plant operation	3.1	Tests are performed in accordance with defined procedures applicable to the operational test
	3.2	Plant is observed for correct operational response
	3.3	Corrective action is taken when response is not

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ELEMENT		PERFORMANCE CRITERIA	
			in accordance with documentation, plant integrity or personnel safety requirements
		3.4	Plant is returned to required operational status upon completion of test
4	Analyse plant faults	4.1	Causes of abnormal plant operating conditions are identified by analysing the technical and operational information in a logical and sequential manner
		4.2	Corrective action taken is in accordance with enterprise/site procedures
		4.3	Plant integrity and personnel safety is maintained through consultation with appropriate personnel, and reference to plant, technical and operational documentation
5	Monitor and inspect plant	5.1	Plant to be monitored/inspected is physically identified
		5.2	Plant is monitored/inspected for normal operation or to detect deviations
		5.3	Corrective action taken is in accordance with enterprise/site procedures
		5.4	Appropriate personnel are notified when defects are detected
6	Complete documentation	6.1	Documentation is updated and plant problems, movements, and abnormalities and status are reported and logged in accordance with enterprise/site procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of operating and monitoring water systems (condensate and feedwater)

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REQUIRED SKILLS AND KNOWLEDGE

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO331B Water systems (condensate and feedwater)

Evidence shall show that knowledge has been acquired for safe working practices of:

T1 Relevant Environmental, Occupational Health and Safety legislation and regulations

T2 Enterprise procedures

T3 Plant drawings and manufacturers manuals

T4 Introduction to and typical arrangements of power production plant

T5 Relevant plant and equipment, its location and operating parameters

T6 Electric motor types and characteristics

T7 Pump and compressor types and characteristics

T8 Valve, damper and actuator types and characteristics

T9 Switchgear types and characteristics

T10 Electrical protection types and characteristics

T11 Relevant state and territory regulations

T12 Deaerator types and characteristics

T13 Feedwater Heaters types and characteristics

T14 Air ejectors types and characteristics

T15 Motor variable speed drive types and characteristics

T16 Plant status

T17 Enterprise recording procedures

T18 Control and data acquisition systems

T19 Thermodynamics

T20 Properties of matter

T21 Lubrication and bearings

T22 Feedwater chemical treatment

T23 Feedwater drainage systems

T24 Circulating water system

T25 Condenser systems

T26 Electrical fundamentals

KS02-PO331B Water systems (condensate and feedwater)

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REQUIRED SKILLS AND KNOWLEDGE

Specific skills needed to achieve the Performance Criteria:

T1 Interpret plant drawings and manufacturers manuals

T2 Apply relevant state and territory regulations

T3 Apply enterprise recording procedures

T4 Identify plant status

T5 Prepare plant/equipment for operation

T6 Organise resources

T7 Operate condensate and feedwater system

T8 Apply diagnostic and testing techniques

T9 Identify and respond to abnormal plant operating conditions

T10 Plan and prioritise work

T11 Use relevant hand tools

T12 Communicate effectively

T13 Apply data analysis techniques and tools.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment	**9.1)**
	Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the

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normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace

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procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
    - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
    - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
    - Demonstrate an appropriate level of employability skills
    - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
    - Knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
    - Preparation and planning of work
    - Operation of condensate and feedwater systems
    - Operationally testing plant
    - Analysing plant faults
    - Monitoring plant operation
    - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of

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work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment

9.4)

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note: Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the unit of competency as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Systems, plant and/or equipment may include electrical supply switchboards; low pressure feed systems; high pressure feed systems; feed heating systems; treated water; chemical treatment systems; condensate return treatment and quality control:

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RANGE STATEMENT

supervisory, alarm and control equipment; high and low pressure pump characteristics/operating conditions; valves and actuators (electric, hydraulic, pneumatic and manual); compressed air systems; filters; strainers; pressure control devices; and HP/LP feed heating systems.

Safety standards may include relevant sections of Occupational Health and Safety legislation, enterprise safety rules, relevant state and federal legislation, national standards for plant and environmental legislation.

Information and documentation sources may include verbal or written communications; enterprise safety rules documentation; dedicated computer equipment; enterprise/site standing and operating instructions; enterprise log books; manufacturer operation and maintenance manuals; and equipment and alarm manuals.

Technical and operational indicators may include stimuli (audio, smell, touch, visual), local indicators and recorders, computers and alarms (visible and or audible).

Communications may be by means of telephone, two way radio, pager, public address system, computer (electronic mail) and operating log (written or verbal).

Tests may include stand-by plant tests, post maintenance operating tests and tests for water quality.

Appropriate personnel to consult, give or receive direction may include supervisor/team leader or equivalent, power plant operations personnel, technical and engineering officers or equivalent, maintenance staff, contractor and specialist personnel and power system control personnel or equivalent.

Test, fault finding and operating tools may include power or hand tools and control system equipment.

Operating environment may be, during inclement or otherwise harsh weather conditions, in wet/noisy/dusty/hot areas, during night periods or during continuous operation.

Faults and abnormal operating conditions may include motor/pump/ actuator/valve/ dampers failure/malfunctions, control equipment failure/ malfunctions, loss of electrical supply to plant and equipment, excessive vibration pumps/motors, high filter/strainer differential pressure, loss of major auxiliary, loss of control medium and water quality.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

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Competency Field

Competency Field **11)**

Operations.

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UEPOPS332B Operate and monitor condensing and cooling systems

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to operate, inspect and monitor condenser cooling and auxiliary cooling systems.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships.

Pre-Requisites

Prerequisite Unit(s) **4)**

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Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Plan and prepare work	1.1	Safety issues are identified to comply with enterprise/site and legislative requirements
	1.2	Work requirements are identified from relevant personnel and documentation
	1.3	Documentation to determine plant status is assessed and evaluate
	1.4	Localised plant inspection, pre-operational checks and field preparation for service are carried out in accordance with manufacturer and enterprise/site procedures
	1.5	Plant operational pre-requisites are established in accordance with manufacturer and enterprise/site procedures
	1.6	Sequence for recommissioning of plant is determined to suit existing circumstances in accordance with enterprise/site requirements
	1.7	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2 Operate plant	2.1	Plant is operated in accordance with enterprise and manufacturer operating procedures
	2.2	Plant is monitored and observed to detect deviations from normal operating conditions
	2.3	Corrective actions taken or reported, to rectify abnormalities are in accordance with industry standards and site requirements
3 Test plant operational	3.1	Tests are performed in accordance with defined procedures applicable to the operational test
	3.2	Plant is observed for correct operational response
	3.3	Corrective action is taken when response is not

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ELEMENT		PERFORMANCE CRITERIA	
			in accordance with documentation, plant integrity or personnel safety requirements
		3.4	Plant is returned to required operational status upon completion of test
4	Analyse plant faults	4.1	Causes of abnormal plant operating conditions are identified by analysing the technical and operational information in a logical and sequential manner
		4.2	Corrective action taken is in accordance with enterprise/site procedures
		4.3	Plant integrity and personnel safety is maintained through consultation with appropriate personnel, and reference to plant, technical and operational documentation
5	Monitor and inspect plant	5.1	Plant to be monitored/inspected is physically identified
		5.2	Plant is monitored/inspected for normal operation or to detect deviations
		5.3	Corrective action taken is in accordance with enterprise/site procedures
		5.4	Appropriate personnel are notified when defects are detected
6	Complete documentation	6.1	Documentation is updated and plant problems, movements, and abnormalities and status are reported and logged in accordance with enterprise/site procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of operating and monitoring condensing and cooling water systems

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REQUIRED SKILLS AND KNOWLEDGE

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO332B Condensing and cooling systems

Evidence shall show that knowledge has been acquired for safe working practices of:

T1 Relevant Environmental, Occupational Health and Safety legislation and regulations

T2 Enterprise procedures

T3 Plant drawings and manufacturers manuals

T4 Introduction to and typical arrangements of power production plant

T5 Relevant plant and equipment, its location and operating parameters

T6 Electric motor types and characteristics

T7 Pump and compressor types and characteristics

T8 Valve, damper and actuator types and characteristics

T9 Switchgear types and characteristics

T10 Electrical protection types and characteristics

T11 Relevant state and territory regulations

T12 Plant status

T13 Enterprise recording procedures

T14 Control and data acquisition systems

T15 Condenser cooling system types and characteristics

T16 Condenser, types and characteristics

T17 Cooling towers, types and characteristics

T18 Air ejector, types and characteristics

T19 Condenser principles

T20 Thermodynamics

T21 Properties of matter

T22 Lubrication and bearings

T23 Feedwater and cooling water treatment

T24 Turbine construction and operating principles

T25 Electrical fundamentals

KS02-PO332B Condensing and cooling systems

Specific skills needed to achieve the Performance Criteria:

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REQUIRED SKILLS AND KNOWLEDGE

T1 Interpret plant drawings and manufacturers manuals

T2 Apply relevant state and territory regulations

T3 Identify plant status

T4 Prepare plant/equipment for operation

T5 Organise resources

T6 Operate condenser and auxiliary cooling water systems

T7 Apply diagnostic and testing techniques

T8 Identify and respond to abnormal plant operating conditions

T9 Plan and prioritise work

T10 Use relevant hand tools

T11 Communicate effectively

T12 Apply data analysis techniques and tools

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment	**9.1)**

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Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with

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the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Preparation and planning of work
  - Operation of condenser and cooling water systems
  - Operationally testing plant
  - Analysing plant faults
  - Monitoring plant operation
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.

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- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note: Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

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Range Statement

RANGE STATEMENT

10) This relates to the unit of competency as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Systems, plant and/or equipment may include electrical supply switchboards; condenser cooling water; auxiliary cooling water; treated water systems; chemical treatment systems; supervisory, alarm and control equipment; high and low pressure pump characteristics/operating conditions; valves, actuators and dampers (electric, hydraulic, pneumatic and manual); compressed air systems; filters; strainers; pressure control devices; heat exchangers; emergency water supply services; drum screens and cleaning systems; and condenser cleaning systems.

Safety standards may include relevant sections of Occupational Health and Safety legislation, enterprise safety rules, relevant state and federal legislation, national standards for plant and environmental legislation.

Information and documentation sources may include verbal or written communications; enterprise safety rules documentation; dedicated computer equipment; enterprise/site standing and operating instructions; enterprise log books; manufacturer operation and maintenance manuals; and equipment and alarm manuals.

Technical and operational indicators may include stimuli (audio, smell, touch, visual), local indicators and recorders, computers and alarms (visible and or audible).

Communications may be by means of telephone, two way radio, pager, public address system, computer (electronic mail) and operating log (written or verbal).

Tests may include stand-by plant tests, post maintenance operating tests and test for water quality.

Appropriate personnel to consult, give or receive direction may include supervisor/team leader or equivalent, power plant operations personnel, technical and engineering officers or equivalent, maintenance staff, contractor and specialist personnel and power system control personnel or equivalent.

Test, fault finding and operating tools may include power or hand tools and control system equipment.

Operating environment may be during inclement or otherwise harsh weather conditions, in wet/noisy/dusty/hot areas, during night periods or during continuous operation.

Faults and abnormal operating conditions may include motor/pump/ actuator/valve/dampers failure/malfunctions, control equipment failure/ malfunctions, loss of electrical supply to plant and equipment, excessive vibration pumps/motors, high filter/strainer differential pressure, loss of major auxiliary, loss of control medium and water conductivity.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information

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RANGE STATEMENT

and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations.

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UEPOPS333B Operate and monitor H.R.S.G. hot gas control system

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to operate, inspect and monitor waste heat recovery systems.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships.

Pre-Requisites

Prerequisite Unit(s) **4)**

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Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Plan and prepare work	1.1	Safety issues are identified to comply with enterprise/site requirements
	1.2	Work requirements are identified from relevant personnel and documentation
	1.3	Documentation to determine plant status is assessed and evaluated
	1.4	Localised plant inspection and field preparation for service are carried out in accordance with manufacturer and enterprise procedures
	1.5	Plant operational pre-requisites are established in accordance with manufacturer and enterprise procedures
	1.6	Sequence for recommissioning of plant is determined to suit existing circumstances in accordance with enterprise/site requirements
	1.7	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2 Operate plant	2.1	Plant is operated in accordance with enterprise and manufacturer operating procedures
	2.2	Plant is monitored and observed to detect deviations from normal operating conditions
	2.3	Corrective actions taken to rectify abnormalities in accordance with manufacturer and enterprise procedures
3 Test plant operation	3.1	Tests are performed in accordance with defined procedures applicable to the operational test
	3.2	Plant is observed for correct operational response
	3.3	Correct action is taken when response is not in accordance with documentation, plant integrity

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ELEMENT		PERFORMANCE CRITERIA	
			or personnel safety requirements
		3.4	Plant is returned to required operational status upon completion of test
4	Analyse plant faults	4.1	Cause of abnormal plant operating conditions are identified by analysing the technical and operational information in a logical and sequential manner
		4.2	Corrective action taken is in accordance with enterprise/site procedures
		4.3	Plant integrity and personnel safety is maintained through consultation with appropriate personnel, and reference to plant, technical and operational documentation
5	Monitor and inspect plant	5.1	Plant to be monitored/inspected is physically identified
		5.2	Plant is monitored/inspected for normal operation or to detect deviations
		5.3	Corrective action taken is in accordance with procedures
6	Complete documentation	6.1	Documentation is updated and plant problems, movements, abnormalities and status are reported and logged in accordance with enterprise/site procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of operating and monitoring H.R.S.G. hot gas control systems.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

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REQUIRED SKILLS AND KNOWLEDGE

KS01-PO333B H.R.S.G. hot gas control system

Evidence shall show that knowledge has been acquired for safe working practices of:

T1 Relevant Environmental, Occupational Health and Safety legislation and regulations

T2 Enterprise procedures

T3 Plant drawings and manufacturers manuals

T4Introduction to and typical arrangements of power production plant

T5 Relevant plant and equipment, its location and operating parameters

T6 Electric motor types and characteristics

T7 Pump and compressor types and characteristics

T8 Valve, damper and actuator types and characteristics

T9 Switchgear types and characteristics

T10 Electrical protection types and characteristics

T11 Relevant state and territory regulations

T12 Plant status

T13 Enterprise recording procedures

T14 Control and data acquisition systems

T15 Prime mover exhaust temperature control system

T16 Gas flow control systems

KS02-PO333B H.R.S.G. hot gas control system

Specific skills needed to achieve the Performance Criteria:

T1 Interpret plant drawings and manufacturers manuals

T2 Apply relevant state and territory regulations

T3 Apply enterprise recording procedures

T4 Identify plant status

T5 Prepare plant/equipment for operation

T6 Organise resources

T7 Operate H.R.S.G. hot gas control system

T8 Apply diagnostic and testing techniques

T9 Identify and respond to abnormal plant operating conditions

T10 Plan and prioritise work

T11 Use relevant hand tools

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REQUIRED SKILLS AND KNOWLEDGE

T12 Communicate effectively

T13 Apply data analysis techniques and tools

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing

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on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures;

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Enterprise/site emergency procedures

- Preparation and planning of work
- Operation of waste heat recovery systems
- Operationally testing plant
- Analysing plant faults
- Monitoring plant operation
- Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment

9.4)

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines..

Note: Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated

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skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the unit of competency as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Systems, plant and/or equipment may include electrical supply switchboard(s); pneumatic, lubricating and oil conditioning systems; supervisory, protection, alarm and control

Equipment; HRSG gas paths; fans; prime movers; filters; strainers; and duct burners,

Safety standards may include relevant sections of Occupational Health and Safety legislation, enterprise safety rules, relevant state and federal legislation and national standards for plant.

Information and documentation sources may include verbal and written communications; enterprise/site safety rules documentation/form(s); enterprise/site standing and operating instructions; enterprise/site log book; manufacturer operation and maintenance manuals; dedicated computer equipment and equipment and alarm manuals.

Technical and operational indicators may include stimuli (audio, smell, touch, visual), local indicators and recorders and alarms (visible and or audible).

Communications may be by means of telephone, two way radio, pager, public address system, computer (electronic mail) and operating log (written or verbal).

Tests may include stand-by plant tests and post maintenance operating tests.

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RANGE STATEMENT

Appropriate personnel to consult, give or receive direction may include supervisor/team leader or equivalent, power system control personnel or equivalent, technical and engineering officers or equivalent, contractor and specialist personnel, maintenance staff and power plant operations personnel.

Test, fault finding and operating tools may include hand and power tools and control system equipment.

Operating environment may be, during inclement or otherwise harsh weather conditions, in wet/noisy/dusty/hot areas, during night periods or during continuous operation.

Faults and abnormal operating conditions may include motor/pump/ actuator/valve/damper failure/malfunctions, control equipment failure/ malfunctions, loss of electrical supply to plant and equipment, fuel leaks/spillages and excessive vibration pumps/motors.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations.

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UEPOPS334B Operate and monitor a wind generator

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to operate, inspect and monitor wind generator plant.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships.

Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

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Prerequisite Unit(s) **4)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Plan and prepare work	1.1	Safety issues are identified to comply with enterprise/site requirements
	1.2	Work requirements are identified from relevant personnel and documentation
	1.3	Documentation to determine plant status is assessed and evaluated
	1.4	Localised plant inspection and field preparation for service are carried out in accordance with manufacturer and enterprise/site procedures
	1.5	Plant operational pre-requisites are established in accordance with manufacturer and enterprise/site procedures
	1.6	Sequence for recommissioning of plant is determined to suit existing circumstances in accordance with enterprise/site requirements
	1.7	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2 Operate plant	2.1	Plant is operated in accordance with enterprise and manufacturer operating procedures
	2.2	Plant is monitored and observed to detect deviations from normal operating conditions
	2.3	Corrective actions are taken to rectify abnormalities in accordance with manufacturer and enterprise/site procedures
3 Test plant operation	3.1	Tests are performed in accordance with defined procedures applicable to the operational test
	3.2	Plant is observed for correct operational response
	3.3	Correct action is taken when response is not in accordance with documentation, plant integrity or personnel safety requirements

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ELEMENT		PERFORMANCE CRITERIA	
4	Analyse plant faults	4.1	Causes of abnormal plant operating conditions are identified by analysing the technical and operational information in a logical and sequential manner
		4.2	Corrective action taken is in accordance with enterprise/site procedures
		4.3	Plant integrity and personnel safety is maintained through consultation with appropriate personnel, and reference to plant, technical and operational documentation
5	Monitor and inspect plant	5.1	Plant to be monitored/inspected is physically identified
		5.2	Plant is monitored/inspected for normal operation or to detect deviations
		5.3	Corrective action taken is in accordance with enterprise procedures
		5.4	Appropriate personnel are notified when defects are detected
6	Complete documentation	6.1	Documentation is updated and plant problems, movements, abnormalities and status are reported and logged in accordance with enterprise/site procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of operating and monitoring a wind generator.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO334B A wind generator

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REQUIRED SKILLS AND KNOWLEDGE

Evidence shall show that knowledge has been acquired for safe working practices of:

T1 Relevant Environmental, Occupational Health and Safety legislation and regulations

T2 Enterprise procedures

T3 Plant drawings and manufacturers manuals

T4 Introduction to and typical arrangements of power production plant

T5 Relevant plant and equipment, its location and operating parameters

T6 Electric motor types and characteristics

T7 Pump and compressor types and characteristics

T8 Valve, damper and actuator types and characteristics

T9 Switchgear types and characteristics

T10 Electrical protection types and characteristics

T11 Wind farm principles

T12 Wind turbine types and characteristics

T13 Wind turbine support systems

T14 Wind turbine generator, types and characteristics

T15 Electrical fundamentals

T16 Plant status

T17 Control and data acquisition systems

KS02-PO334B A wind generator

Specific skills needed to achieve the Performance Criteria:

T1 Interpret plant drawings and manufacturers manuals

T2 Identify plant status

T3 Prepare plant/equipment for operation

T4 Organise resources

T5 Operate wind generator

T6 Apply diagnostic and testing techniques

T7 Identify and respond to abnormal plant operating conditions

T8 Plan and prioritise work

T9 Use relevant hand tools;

T10 Communicate effectively

T11 Apply data analysis techniques and tools

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Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and

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developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Preparation and planning of work
  - Operation of wind generator and associated plant
  - Operationally testing plant

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- Analysing plant faults
- Monitoring plant operation
- Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items

Context of and specific resources for assessment **9.3)**

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines..

Note: Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit

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Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the unit of competency as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Systems, plant and/or equipment may include electrical supply switchboard(s) and transformers; wind generator; supervisory, alarm, protection and control equipment.

Safety standards may include relevant sections of Occupational Health and Safety legislation, enterprise safety rules, relevant state and federal legislation and national standards for plant.

Information and documentation sources may include verbal or written communications; enterprise safety rules documentation; dedicated computer equipment; enterprise/site standing and operating instructions; enterprise log books; manufacturer operation and maintenance manuals; and equipment and alarm manuals.

Technical and operational indicators may include stimuli (audio, smell, touch, visual), local indicators and recorders, computers and alarms (visible and or audible).

Communications may be by means of telephone, two way radio, pager, public address system, computer (electronic mail) and operating log (written or verbal).

Tests may include stand-by plant tests and post maintenance operating tests.

Appropriate personnel to consult, give or receive direction may include supervisor/team leader or equivalent, technical and engineering officers or equivalent, power system control personnel or equivalent, contractor and specialist personnel, maintenance staff and power plant operations personnel.

Test, fault finding and operating tools may include high voltage testers, proving dead equipment, power or hand tools and control system equipment.

Operating environment may be during inclement or otherwise harsh weather

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RANGE STATEMENT

conditions, in wet/noisy/dusty/hot areas or during night periods.

Faults and abnormal operating conditions may include speed controller faults, excessive vibration, blade position controller malfunctions and lubrication failure.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations.

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UEPOPS335B Operate a hydro generator synchronous condenser pump unit

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to start-up, maintain steady state running and shutdown a hydro unit operating in generator or synchronous condenser or pump mode.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety.

Pre-Requisites

Prerequisite Unit(s) **4)**

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Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Plan and prepare work	1.1	Safety issues are identified to comply with enterprise/site requirements
	1.2	Work, plant and type of start requirements are identified from relevant personnel and documentation
	1.3	The turbine running-up and loading schedule are ascertained from relevant documentation and in accordance with enterprise/site requirements
	1.4	Localised plant inspection, pre operational tests and field preparation for service are carried out in accordance with manufacturer and enterprise/site procedures
	1.5	Plant operational pre-requisites are established in accordance with manufacturer and enterprise/site procedures
	1.6	Sequence for recommissioning of plant is determined to suit existing circumstances in accordance with enterprise/site requirements
2 Operate plant	2.1	Plant is operated in accordance with enterprise and manufacturer operating procedures
	2.2	Plant is monitored and observed to detect deviations from normal operating conditions
	2.3	Corrective actions are taken to rectify abnormalities in accordance with manufacturer and enterprise/site procedures
3 Test plant operation	3.1	Tests are performed in accordance with defined procedures applicable to the operational test
	3.2	System and plant is observed for correct operational response
	3.3	Correct action is taken when response is not in accordance with documentation, plant integrity or personnel safety requirements

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ELEMENT	PERFORMANCE CRITERIA	
	3.4	Plant is returned to required operational status upon completion of test
4 Analyse plant faults	4.1	Cause of abnormal plant operating conditions are identified by analysing the technical and operational information in a logical and sequential manner
	4.2	Actions necessary to rectify fault are correctly determined
	4.3	Plant integrity and personnel safety is maintained through consultation with appropriate personnel, and reference to plant, technical and operational documentation
	4.4	Appropriate personnel is notified when defects are detected
.5 Complete documentation	5.1	Documentation is updated and plant problems, movements, abnormalities and status are reported and logged in accordance with enterprise/site procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of operating a hydro generator/synchronous condenser/pump unit.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO335B A hydro generator/synchronous condenser/pump unit

Evidence shall show that knowledge has been acquired for safe working practices of:

T1 Relevant Environmental, Occupational Health and Safety legislation and regulations

T2 Enterprise procedures

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REQUIRED SKILLS AND KNOWLEDGE

T3 Plant drawings and manufacturers manuals

T4 Introduction to and typical arrangements of hydro power production plant

T5 Relevant plant and equipment, its location and operating parameters

T6 Electric motor types and characteristics

T7 Pump and compressor types and characteristics

T8 Valve, damper and actuator types and characteristics

T9 Switchgear types and characteristics

T10 Electrical protection types and characteristics

T11 Relevant state and territory regulations

T12 Plant status

T13 Control and data acquisition systems

T14 Hydro turbine, types and characteristics

T15 Hydro turbine governor, types and characteristics

T16 Headgate, tailgate, intake, penstock, tunnels and tail races, types and characteristics

T17 hydro generator types and characteristics

T18 Generator performance characteristics

T19 Speed control systems

T20 Electrical fundamentals

T21 Electrical supply and distribution systems

T22 heat exchanger types and characteristics

T23 lubrication systems and oil conditioning systems

T24 Equipment behaviours under the influence of high water pressure and/or flows

KS02-PO335B A hydro generator/synchronous condenser/pump unit

Specific skills needed to achieve the Performance Criteria:

T1 Interpret plant drawings and manufacturers manuals

T2 Apply relevant state and territory regulations

T3 Apply enterprise recording procedures

T4 Identify plant status

T5 Prepare plant/equipment for operation

T6 Organise resources

T7 Apply diagnostic and testing techniques

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REQUIRED SKILLS AND KNOWLEDGE

T8 Identify and respond to abnormal plant operating conditions

T9 Plan and prioritise work

T10 Use relevant hand tools

T11 Communicate effectively

T12 Apply data analysis techniques and tools

T13 Operate equipment under the influence of high water pressures and or flows

T14 Co-ordinate the remote operation of equipment to maintain personnel safety and plant integrity

T15 Operate a hydro turbine generator/pump unit.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the

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most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential

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Knowledge and Associated Skills of this unit
- Demonstrate an appropriate level of employability skills
- Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures

- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Preparation and planning of work
  - Operation of hydro turbine generator/pump unit
  - Operationally testing plant
  - Analysing plant faults
  - Monitoring plant operation
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

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Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note: Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the unit of competency as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Plant and equipment may include turbines; turbines with underslung pumps; reversible turbines; auxiliary plant and equipment; governor and associated hydraulic circuits; generator and generator auxiliary plant; computer with equipment control functions; supervisory, alarm and control equipment; electrical motors, fans and pumps; electrical supply and distribution systems; valves and dampers (electric, hydraulic, pneumatic and manual); lubrication and oil conditioning systems; static/rotating rectifiers; brush gear and slipring fire protection equipment; brush gear, sliprings and commutators; AVR/AER; heat exchangers, filters and strainers; generators; transformers; water drainage systems; and environmental protective systems.

Safety standards may include relevant sections of Occupational Health and Safety

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RANGE STATEMENT

legislation, enterprise safety rules, relevant state and federal legislation, national standards for plant and Australian standards.

Information and documentation sources may include verbal or written communications; enterprise safety rules documentation; enterprise operating instructions; dedicated computer equipment; enterprise/site standing and operating instructions; enterprise log books; manufacturer operation and maintenance manuals; and equipment and alarm manuals.

Technical and operational indicators may include stimuli (audio, smell, touch, visual), remote or local indicators and recorders, computers and alarms (visible and or audible).

Tests may include motor direction checks, stand-by plant “cut-in” tests, relief valves operation tests, overspeed tests, main inlet valves/guide vanes timing tests, load rejection tests and phase rotation tests.

Communications may be by means of telephone, two way radio, pager, computer (electronic mail) and operating logs (written or verbal).

Appropriate personnel to consult, give or receive direction may include, supervisor/team leader or equivalent, engineering officer / hydro maintenance office or equivalent, technical and engineering officers or equivalent, contractor staff, maintenance staff, applicable water control authority or equivalent and “transgrid” operator or equivalent.

Test, fault finding and operating tools may include low and high voltage testers, proving dead equipment, powered or non-powered hand tools.

Operating environment may be remote from plant, aided by indicators and monitors, during inclement or otherwise harsh weather conditions, in wet/noisy/dusty/hot areas, during night periods or locally aided by visual and audible indicators.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations.

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UEPOPS336B Manage, operate and monitor a gas turbine unit

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to undertake the management of an in-service gas turbine unit.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships.

Pre-Requisites

Prerequisite Unit(s) **4)**

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Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT		PERFORMANCE CRITERIA	
1	Plan and prepare work	1.1	Safety issues are identified to comply with enterprise/site requirements
		1.2	Work requirements are identified from relevant personnel and documentation
		1.3	Pre operational checks are carried out on plant according to manufacturer recommendations and site requirements
		1.4	Where appropriate the teams and individuals roles and responsibilities within the team are identified, and where required, assist in the provision of the on-the-job training
2	Operate plant	2.1	Output is adjusted to achieve required gas turbine operating conditions and demand, observing operatic requirements
		2.2	Plant is operated within limits of plant design, enterprise or site requirements
		2.3	Plant is monitored and observed to detect deviations from required operating conditions
		2.4	Corrective actions are taken to rectify abnormalities in accordance with manufacturer and enterprise/site procedures
3	Test plant operation	3.1	Tests are performed in accordance with defined procedures applicable to the operational test
		3.2	System and plant is observed for correct operational response
3		3.3	Corrective action is taken when response is not in accordance with documentation, plant integrity or personnel safety requirements
		3.4	Plant is returned to required operational status upon completion of test
4	Analyse system faults	4.1	Causes of abnormal plant operating conditions are identified by analysing the technical and

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ELEMENT	PERFORMANCE CRITERIA	
		operational information in a logical and sequential manner
	4.2	Corrective action taken is in accordance with enterprise/site procedures
	4.3	Plant integrity and personnel safety is maintained through consultation with appropriate personnel, and reference to plant, technical and operational documentation
	4.4	Appropriate personnel are notified when defects are detected
5 Monitor plant	5.1	Plant to be monitored is identified
	5.2	Plant is monitored for normal operation or to detect deviations
	5.3	Appropriate personnel are notified when defects are detected
6 Complete documentation	6.1	Documentation is updated and plant problems, movements, abnormalities and status are reported and logged in accordance with enterprise/site procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of conducting single energy source isolation procedures.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO336B A gas turbine unit

Evidence shall show that knowledge has been acquired for safe working practices of:

T1 Relevant Environmental, Occupational Health and Safety legislation and regulations

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REQUIRED SKILLS AND KNOWLEDGE

T2 Enterprise procedures

T3 Plant drawings and manufacturers manuals

T4 Introduction to and typical arrangements of power production plant

T5 Relevant plant and equipment, its location and operating parameters

T6 Electric motor types and characteristics

T7 Pump and compressor types and characteristics

T8 Valve, damper and actuator types and characteristics

T9 Switchgear types and characteristics

T10 Electrical protection types and characteristics

T11 Relevant state and territory regulations

T12 Gas turbine principle of operation

T13 Air intake, types and characteristics

T14 Air inlet cooling and heating systems, types and characteristics

T15 Exhaust, types and characteristics

T16 Lubrication systems, types and characteristics

T17 Control oil systems, types and characteristics

T18 Water wash systems, types and characteristics

T19 Cooling systems, types and characteristics

T20 Water/steam injection systems, types and characteristics

T21 Combustion system, types and characteristics

T22 Generator, types and characteristics

T23 Generator excitation system, types and characteristics

T24 Electrical fundamentals

T25 Plant status

T26 Enterprise recording procedures

T27 Control and data acquisition systems

T28 Computers and software

T29 supervisory, alarm, protection equipment

T30 Fire protection control system, types and characteristics

KS02-PO336B A gas turbine unit

Specific skills needed to achieve the Performance Criteria:

T1 Interpret plant drawings and manufacturers manuals

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REQUIRED SKILLS AND KNOWLEDGE

T2 Apply relevant state and territory regulations

T3 Apply enterprise recording procedures

T4 Identify plant status

T5 Prepare plant/equipment for operation

T6 Organise resources

T7 Operate gas turbine plant and equipment

T8 Apply diagnostic and testing techniques

T9 Identify and respond to abnormal plant operating conditions

T10 Plan and prioritise work

T11 Use relevant hand tools

T12 Communicate effectively

T13 Apply data analysis techniques and tools

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment	**9.1)**
	Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full

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can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement

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- Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
- Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
- Demonstrate an appropriate level of employability skills
- Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures

- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Preparation and planning of work
  - Operation of gas turbine plant/equipment
  - Operationally testing plant
  - Analysing plant faults
  - Monitoring plant operation
  - Knowledge of the system components and their interaction;
  - Knowledge of gas turbine operational processes
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of

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work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment

9.4)

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note: Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the unit of competency as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Plant and equipment may include; electrical supply switchboard(s) and transformers; gas turbine and auxiliary plant; fuel and fuel delivery system plant; fuel management system; flame detection equipment; air inlet, cooling systems, fuel conditioning,

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RANGE STATEMENT

turning gear, water wash system, starter systems plant, gas turbine temperature control plant; electric motors (a.c. and d.c., high and low voltage); electricity distribution system (a.c. and d.c. transformers); diesel engine driven auxiliary plant; station water distribution systems; hydraulic power oil system; compressed air systems; computers with equipment control functions; supervisory, alarm, protection and control equipment.

Safety standards may include relevant sections of Occupational Health and Safety legislation, enterprise safety rules, electricity workers act, national standards for plant.

Information and documentation sources may include verbal or written communications; enterprise isolation documentation; site operating instructions; plant limit book; equipment and alarm manuals; crippled plant book; daily log book; dedicated computer equipment; documented enterprise instructions, local and general.

Technical and operational indicators may include stimuli (audio, smell, touch, visual), remote or local indicators and recorders, computers, alarms (visible and/or audible).

Communications may be by means of telephones, two way radios, pagers, facsimiles, computers (electronic mail), operating logs (written or verbal).

Tests may include loss of major auxiliary controls response checks, stand-by plant "cut-in" tests, dampers/valves operating checks, performance tests.

Appropriate personnel to consult, give or receive direction may include, supervisor/team leader or equivalent; other coordinators of energy production or equivalent; technical and engineering officers or equivalent; maintenance staff; other operating staff; contractor staff.

Operating environment may be remote from plant and equipment being operated; operation is assisted by remote indicators of plant status and other parameters monitored; wet/noisy/dusty/hot areas, continuous operation.

Plant operations (systems requirements) may include normal operating/generating mode.

Faults and abnormal operating conditions may include loss of a major auxiliary; loss of electrical supply to switchboard(s), motors; operating limits exceeded; control system malfunctions; high temperatures, exhaust (back end), motor, fan, pump bearings and lubricating oil, motor windings; fuel preparation and delivery systems fires; fuel system malfunction; excessively high heating/cooling rates; high dp's on oil/air filters and strainers; failed field devices; failed/malfunctioning actuators/dampers/valves; gas turbine protection operation and gas turbine surging.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

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Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations.

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UEPOPS337B Maintain quality systems within the team

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to oversee compliance with performance indicators through the maintenance of quality systems within a team environment.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships.

Pre-Requisites

Prerequisite Unit(s) **4)**

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Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
UEPOPS202B	Apply quality systems to work

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading	3	Writing	3	Numeracy	3

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a

Performance Criteria describe the required performance needed to demonstrate achievement of the element.

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competency standard unit	Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Formulate team aspects of the quality system	1.1	Team quality assurance requirements/targets are identified or modified from an analysis of enterprise needs
	1.2	Team performance indicators, identified during team consultations, are agreed or referred to the appropriate party for approval in accordance with job requirements
	1.3	Compatibility between total team and total individual performance indicators is effectively co-ordinated in accordance with job requirements
	1.4	Site and team quality systems documentation is obtained, edited and summarised as required and made available to all members in accordance with job requirements
	1.5	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2 Facilitate team quality systems	2.1	Team members are provided with encouragement and training in team quality systems matters in accordance with job requirements
	2.2	The application of quality systems is monitored regularly both in the workplace and with customers in accordance with job requirements
	2.3	Instances of inability to satisfy key performance indicators are recorded, investigated and referred to team mechanisms and appropriate authorities for remedial actions in accordance with enterprise procedures

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ELEMENT	PERFORMANCE CRITERIA	
	2.4	Quality systems are regularly reviewed with the team to ensure their currency and continuing relevance in accordance with enterprise procedures
	2.5	Team quality systems records are maintained and made available to interest parties in accordance with enterprise procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence must show that knowledge has been acquired of safe working practices and maintaining quality systems within a team.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

KS01-PO337B Maintain quality systems within the team

Evidence shall show an understanding of how to maintain quality systems within a team environment, to an extent indicated by the following aspects:

T1 Quality management theory

- Standardisation
- Waste
- Measurement
- Variation
- Control limits

T2 Quality Management System

- Elementary quality systems design processes
- Internal and third party auditing techniques
  - Sampling
  - Process mapping
  - Interviewing

T3 Performance reporting:

- Key result areas (accountabilities)
- Key performance indicators

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REQUIRED SKILLS AND KNOWLEDGE

- Quantitative measures
- Qualitative measures

T4 Advanced quality management tools and techniques, including the development, use and interpretation of:

- Pareto charts
- Run charts and graphs
- Range control charts
- Scattergrams
- 5-S

T5 Advanced continuous improvement techniques:

- Kaizen
- Techniques to measure, validate and value changes made to a process.
- Enterprise-based systems to recommend and implement workplace improvements.
- Lead employee participative initiative processes, including
  - Quality Circles
  - Brainstorming
  - Suggestion schemes

T6 Communication when leading a team:

- Team meeting techniques
  - action planning
  - minute taking

Structured on-the-job training techniques

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment	**9.1)**

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Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with

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the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Australian and/or international standards related to quality
  - Monitoring and reviewing quality systems
  - Maintaining records and documentation
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

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Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note: Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

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RANGE STATEMENT

10) This relates to the unit of competency as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Work may be affected by Australian standards, Occupational Health and Safety standards, codes of practice, manufacturer specifications, environmental requirements and enterprise procedures.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations.

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UEPOPS338B Facilitate effective workplace communication

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to facilitate effective workplace communication.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships.

Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

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Prerequisite Unit(s) **4)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT		PERFORMANCE CRITERIA	
1	Plan and prepare for communication	1.1	Communication requirements are identified from interpretation of probable work requirements and customer service activities
		1.2	Communication network is established to ensure reliable, expeditious and cost effective communications in accordance with enterprise/site requirements
		1.3	Communications network is monitored and modified as required in accordance with enterprise/site requirements
		1.4	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2	Facilitate team communications	2.1	Briefings and meetings are scheduled as required in accordance with enterprise/site requirements
		2.2	Team members are encouraged to participate in the creation of an environment in which all views are aired and considered in accordance with enterprise policy
		2.3	Team members are encouraged to present points of view in a clear, concise and logical manner accepting the need for rational and productive debate
3	Determine team views	3.1	Team point of view is agreed to in accordance with enterprise policy
		3.2	Decisions and outcomes are conveyed to all team members in accordance with enterprise policy

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this

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REQUIRED SKILLS AND KNOWLEDGE

unit.

Evidence shall show that knowledge has been acquired of facilitating effective workplace communication.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO338B Effective workplace communication

Evidence shall show that knowledge has been acquired for safe working practices of:

T1 Relevant environmental, occupational health and safety legislation and regulations

T2 Enterprise procedures

T3 Document writing principles

T4 Enterprise communication equipment and procedures

T5 Enterprise documentation procedures

T6 Enterprise meeting agenda requisites

T7 Enterprise recording procedures

T8 Enterprise communication procedures

KS02-PO338B Effective workplace communication

Specific skills needed to achieve the Performance Criteria:

T1 Interpret instructions

T2 Write meeting minutes

T3 Communicate effectively.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

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Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit **9.2)**

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered

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holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Planning and preparing for communication
  - Facilitating team meetings
  - Communication procedures
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.

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- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note: Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

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Range Statement

RANGE STATEMENT

10) This relates to the unit of competency as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Communications may include face to face discussions, letters, telephone, facsimile, time sheets, radios, e-mail, memos, workshop/toolbox meetings and approved enterprise proformas.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations.

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UEPOPS339B Operate and monitor a boiler unit

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to operate and monitor the in-service boiler unit capable of supplying steam.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships.

Pre-Requisites

Prerequisite Unit(s) **4)**

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Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Plan and prepare work	1.1	Safety issues are identified to comply with enterprise/site requirements
	1.2	Work requirements are identified from relevant personnel and documentation
	1.3	Pre-operational checks are carried out on plant according to manufacturer recommendations and site requirements
	1.4	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2 Operate plant	2.1	Combustion is established and supported in accordance with enterprise, manufacturer and site requirements. Combustion support fuel consumption is kept at minimum levels
	2.2	Fuel and air and feed flows are adjusted to achieve required steam conditions and demand and observing operating requirements
	2.3	Plant is operated within limits of plant design, enterprise or site requirements
	2.4	Plant is monitored and observed to detect deviations from required operating conditions
	2.5	Corrective actions are taken to rectify abnormalities in accordance with manufacturer and enterprise/site procedures
3 Test plant operation	3.1	Tests are performed in accordance with defined procedures applicable to the operational test
	3.2	System and plant are observed for correct operational response
	3.3	Corrective action is taken when response is not in accordance with documentation, plant integrity or personnel safety requirements

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ELEMENT		PERFORMANCE CRITERIA	
		3.4	Plant is returned to required operational status upon completion of test
4	Analyse system faults	4.1	Causes of abnormal plant operating conditions are identified by analysing the technical and operational information in a logical and sequential manner
		4.2	Corrective action taken is in accordance with enterprise/site procedures
		4.3	Plant integrity and personnel safety is maintained through consultation with appropriate personnel, and reference to plant, technical and operational documentation
		4.4	Appropriate personnel are notified when defects are detected
5	Monitor plant	5.1	Plant to be monitored is identified
		5.2	Plant is monitored for normal operation or to detect deviations
		5.3	Appropriate personnel are notified when defects are detected
6	Complete documentation	6.1	Documentation is updated and plant problems, movements, abnormalities and status are reported and logged in accordance with enterprise/site procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of operating and monitoring a boiler unit.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

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REQUIRED SKILLS AND KNOWLEDGE

KS01-PO339B A boiler unit

Evidence shall show that knowledge has been acquired for safe working practices of:

T1 Relevant environmental, occupational health and safety legislation and regulations

T2 Enterprise procedures

T3 Plant drawings and manufacturers manuals

T4 Introduction to and typical arrangements of power production plant

T5 Relevant plant and equipment, its location and operating parameters

T6 Electric motor types and characteristics

T7 Pump and compressor types and characteristics

T8 Valve, damper and actuator types and characteristics

T9 Switchgear types and characteristics

T10 Electrical protection types and characteristics

T11 Relevant state and territory regulations

T12 Plant status

T13 Enterprise recording procedures

T14 Steam/water system, types and characteristics

T15 Control and data acquisition systems

T16 Supervisory, alarm, burner protection equipment

T17 Emergency procedures

T18 Boiler operation processes

T19 The system components and their interaction with other plant and equipment external to that covered by this competency

T20 Principles of air heater operation

T21 Principles of relevant fuel combustion;

T22 Fire protection control systems, types and characteristics

T23 Principles of boiler and feedwater chemical treatment

T24 Thermodynamics

T25 Properties of matter

T26 Lubrication and bearings

T27 Boiler water and steam systems

T28 Boiler draught system, types and characteristics

T29 Fuel firing plant, types and characteristics

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REQUIRED SKILLS AND KNOWLEDGE

T30 Principles governing efficient combustion

T31 Principles of boiler efficiency

T32 Electrical principles

T33 Electrical fundamentals

KS02-PO339B A boiler unit

Specific skills needed to achieve the Performance Criteria:

T1 Interpret plant drawings and manufacturers manuals

T2 Apply relevant state and territory regulations

T3 Apply relevant statutory legislation

T4 Apply relevant enterprise/site safety procedures

T5 Apply enterprise/site emergency procedures and techniques

T6 Apply enterprise recording procedures

T7 Identify plant status

T8 Prepare plant/equipment for operation

T9 Organise resources

T10 Operate boiler plant and equipment

T11 Apply diagnostic and testing techniques

T12 Identify and respond to abnormal plant operating conditions

T13 Plan and prioritise work

T14 Use relevant hand tools

T15 Communicate effectively

T16 Apply data analysis techniques and tools

T17 Continuity of supply and optimum efficiency.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in

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EVIDENCE GUIDE

accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in **9.2)**

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this unit

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Preparation and planning of work
  - Operation of boiler plant and equipment
  - Operationally testing plant
  - Analysing plant faults
  - System components and interaction with other plant and equipment
  - Temperature and pressure requirements
  - Ability to prepare plant/equipment for operation
  - Principles of relevant fuel combustion
  - Principles of boiler and feedwater chemical treatment
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above

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listed items

Context of and specific resources for assessment **9.3)**

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note: Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with **9.5)**

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other units

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the unit of competency as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Plant and equipment may include boiler and auxiliary plant; fuel and fuel delivery system; fuel management system; flame detection equipment; steam temperature control plant; boiler heating surfaces; draft system; ash and dust removal system; combustion waste extraction system; electric motors (a.c. and d.c., high and low voltage); station water distribution systems; hydraulic power oil system; compressed air systems; computers with equipment control functions; and supervisory, alarm, protection and control equipment; steam water cycle.

Safety standards may include relevant sections of Occupational Health and Safety legislation, enterprise safety rules, electricity workers act and national standards for plant

Information and documentation sources may include verbal or written communications; enterprise isolation documentation; site operating instructions; plant limit book; equipment and alarm manuals; crippled plant book; daily log book; dedicated computer equipment; and local and general documented enterprise instructions.

Technical and operational indicators may include stimuli (audio, smell, touch, visual), remote or local indicators and recorders, computers and alarms (visible and or audible).

Communications may be by means of telephone, two way radio, pager, facsimile, computer (electronic mail) and operating log (written or verbal).

Tests may include loss of major auxiliary controls response checks, stand-by plant “cut-in” tests, dampers/valves operating checks and performance tests.

Appropriate personnel to consult, give or receive direction may include supervisor/team leader or equivalent; other coordinators of energy production or equivalent; technical and engineering officers or equivalent; maintenance staff; other operating staff and contractor staff.

Operating environment may be remote from plant and equipment being operated;

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RANGE STATEMENT

(operation is assisted by remote indicators of plant status and other parameters monitored); in wet/noisy/dusty/hot areas or during continuous operation.

Plant operations (systems requirements) may include normal operating/ generating mode.

Faults and abnormal operating conditions may include loss of a major auxiliary (e.g. boiler combustion air fan); loss of electrical supply to switchboard(s), motors; boiler water chemical operating limits exceeded; automatic control loop(s) malfunctions; boiler heating surfaces dust removal system malfunctions (high/low pressure/temperature, control equipment faults, jammed sootblowers); high temperatures on/in, boiler heating surfaces/tubes/headers, boiler exhaust (back end), steam to turbine, ex superheater or reheater, motor, fan, pump bearings and lubricating oil, motor windings; boiler tube leaks; air heater cold end temperatures low; air heater/combustion air ductwork fires; fuel preparation and delivery systems fires; fuel system malfunction; excessive drum water level split; excessively high heating/cooling rates; high/low furnace dp; high dp's on oil/air filters and strainers; failed field devices (pressure/level switches/transmitters, thermocouples); failed/malfunctioning actuators/dampers/ valves; boiler feedwater pumps malfunctions (high bearing vibration, high suction strainer dp, low NPSH, high temperature differentials, pump trip, lubricating oil/electric motor cooler tube leak.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations.

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UEPOPS340B Operate and monitor a steam turbine

Modification History

Release	Action	Core/Elective	Details	Points
2	Edit		Remove word ‘of’ in Unit Descriptor.	

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to operate and monitor an in-service steam turbine.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit may require a licence to practise in the workplace in some States or Territories. There may also be additional assessment activities required by regulatory authorities for the issue of the licence to practise.

Practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the Performance Criteria describe the required performance

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essential outcomes of a competency standard unit	needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Plan and prepare work	1.1	Safety issues are identified to comply with enterprise/site requirements
	1.2	Work requirements are identified from relevant personnel and documentation
	1.3	Pre-operational checks are carried out on plant according to manufacturer recommendations and site requirements
	1.4	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2 Operate plant	2.1	Turbine output is adjusted to meet demand whilst observing operating requirements and minimising turbine life expenditure
	2.2	Plant is operated in accordance with enterprise and manufacturer operating procedures
	2.3	Plant is monitored and observed to detect deviations from normal operating conditions
	2.4	Corrective actions are taken to rectify abnormalities in accordance with manufacturer and enterprise/site procedures
3 Test plant operation	3.1	Tests are performed in accordance with defined procedures applicable to the operational test
	3.2	System and plant is observed for correct operational response
	3.3	Corrective action is taken when response is not in accordance with documentation, plant integrity or personnel safety requirements

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ELEMENT		PERFORMANCE CRITERIA	
		3.4	Plant is returned to required operational status upon completion of test
4	Analyse system faults	4.1	Causes of abnormal plant operating conditions are identified by analysing the technical and operational information in a logical and sequential manner
		4.2	Corrective action taken is in accordance with enterprise/site procedures
		4.3	Plant integrity and personnel safety is maintained through consultation with appropriate personnel, and reference to plant, technical and operational documentation
		4.4	Appropriate personnel are notified when defects are detected
5	Monitor plant	5.1	Plant to be monitored is identified
		5.2	Plant is monitored for normal operation or to detect deviations
		5.3	Appropriate personnel are notified when defects are detected
6	Complete documentation	6.1	Documentation is updated and plant problems, movements, abnormalities and status are reported and logged in accordance with enterprise/site procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of operating and monitoring a steam turbine.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

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REQUIRED SKILLS AND KNOWLEDGE

KS01-PO340B A steam turbine

Evidence shall show that knowledge has been acquired for safe working practices of:

T1 Relevant environmental, occupational health and safety legislation and regulations

T2 Enterprise procedures

T3 Plant drawings and manufacturers manuals

T4 Introduction to and typical arrangements of power production plant

T5 Relevant plant and equipment, its location and operating parameters

T6 Electric motor types and characteristics

T7 Pump and compressor types and characteristics

T8 Valve, damper and actuator types and characteristics

T9 Switchgear types and characteristics

T10 Electrical protection types and characteristics

T11 Electrical fundamentals

T12 Relevant state and territory regulations

T13 Plant status

T14 Enterprise recording procedures

T15 Control and data acquisition systems

T16 Supervisory, alarm and protection equipment

T17 Turbine speed control equipment

T18 Heat transfer principles

T19 System components and interaction

T20 The system components and their interaction with other plant and equipment external to that covered by this competency

T21 Station water distribution systems

T22 Fire protection control systems

T23 Principles of condensate and feedwater chemical treatment

T24 Turbine life expenditure and control

T25 Turbine bypass system

T26 Vacuum raising and turbine gland sealing systems

T27 Thermodynamics

T28 Properties of matter

T29 Lubrication and bearings

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REQUIRED SKILLS AND KNOWLEDGE

T30 Liquid pumping systems

T31 Turbine construction and operating principles

T32 Turbine lubrication and oil systems, types and characteristics

T33 Condensate and feedwater systems

T34 Circulating water system

T35 Condenser systems, types and characteristics

T36 Turbine efficiency principles

T37 Transformers, types and characteristics

KS02-PO340B A steam turbine

Specific skills needed to achieve the Performance Criteria:

T1 Interpret plant drawings and manufacturers manuals

T2 Apply relevant state and territory regulations

T3 Apply enterprise recording procedures

T4 Identify plant status

T5 Prepare plant/equipment for operation

T6 Organise resources

T7 Operate turbine plant and equipment

T8 Apply diagnostic and testing techniques

T9 Identify and respond to abnormal plant operating conditions

T10 Plan and prioritise work

T11 Use relevant hand tools

T12 Communicate effectively

T13 Apply data analysis techniques and tools.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in

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EVIDENCE GUIDE

accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in **9.2)**

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this unit

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Preparation and planning of work
  - Operation of turbine plant and equipment
  - Operationally testing plant
  - Analysing plant faults
  - Monitoring plant operation
  - Knowledge of the system components and their interaction
  - Knowledge of turbine operational processes
  - Knowledge of turbine supervision and control systems
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items

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Context of and specific resources for assessment **9.3)**

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note: Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

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There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the unit of competency as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Plant and equipment may include turbine and auxiliary plant; turbine lubrication and power/control oil systems; turbine by-pass system plant; condensate and feedwater system plant to boiler economiser inlet NRV; condensate polishing plant; high and low pressure heating systems; steam condensing and cooling systems; condenser vacuum raising equipment; turbine glad sealing equipment; cooling water systems plant; boiler feedwater deaerating equipment; condensate and feedwater chemical treatment equipment; electricity distribution systems a.c. and d.c.; station water distribution systems; hydraulic oil system; pumps; compressed air systems; computers with equipment control functions; supervisory, alarm, protection and control equipment; and diesel engine driven auxiliary plant

Safety standards may include relevant sections of Occupational Health and Safety legislation, enterprise safety rules, Australian standards, national standards for plant and relevant state and federal legislation.

Information and documentation sources may include verbal or written communications; enterprise safety rules documentation; enterprise operating instructions; manufacturer operational and maintenance manuals; equipment and alarm manuals; enterprise log books; dedicated computer equipment; enterprise standing instructions; and plant notes.

Technical and operational indicators may include stimuli (audio, smell, touch, visual), remote or local indicators and recorders, computers and alarms (visible and or audible).

Communications may be by means of telephone, two way radio, pager, computer (electronic mail) and operating log (written or verbal).

Tests may include loss of a major auxiliary controls response checks, stand-by plant “cut-in” tests, valves operating checks, on-load turbine valve and emergency governor operation test, performance tests, boiler feed pumps “low load leak off” valve operation tests, heater leak checks, alarm and protection tests.

Appropriate personnel to consult, give or receive direction may include supervisor/team leader or equivalent; other coordinators of energy production or

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RANGE STATEMENT

equivalent; technical and engineering officers or equivalent; maintenance staff; other operating staff and contractor staff.

Operating environment may be remote from plant and equipment being operated; where operation is assisted by remote indicators of plant status and other parameters monitored; in wet/noisy/dusty/hot areas; during night periods; and during inclement or otherwise harsh weather conditions.

Faults and abnormal operating conditions may include loss of a major auxiliary; loss of electrical Generation to auxiliaries); turbine water ingress; excessively high turbine and turbine valves heating/cooling rates/differentials; high condenser vacuum; condenser tube leak; high dissolved oxygen, conductivity; high turbine bearing temperatures/vibration; high/low bearing oil temperature; loss of turbine bearing oil flow/pressure; low/high pressure heaters malfunctions; actuator/valve mechanical/electrical faults/failure; failed field devices; and turbine protection.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations.

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UEPOPS342B Interpret and analyse single operation protection devices

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to interpret and analyse of the operation of single operation protection devices.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships.

Pre-Requisites

Prerequisite Unit(s) **4)**

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Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Respond to protection operation	1.1 Protection operation is confirmed in accordance with enterprise procedures
	1.2 Apparatus affected is identified in accordance with enterprise procedures
	1.3 Targets, flags and alarms are identified and recorded in accordance with enterprise/site procedure
	1.4 Relevant stake holders are advised in accordance with enterprise procedures
	1.5 Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training.
2 Interpret and determine cause of protection operation	2.1 External information is managed and communication with external stakeholders is conducted and recorded in accordance with enterprise procedures
	2.2 Information is collated and assessed in a logical and sequential manner in accordance with enterprise procedures
	2.3 Sequence of events prior to and following protection operation is identified and assessed in accordance with enterprise procedures
	2.4 Protection operations are assessed and evaluated in accordance with enterprise procedures
	2.5 Findings are analysed in conjunction with protection type and recorded data, to determine most probable cause of protection operation
3 Restore protection	3.1 All relevant stake holders are informed of findings and plan of action in accordance with enterprise procedures
	3.2 Relevant protection indicators are reset in accordance with enterprise procedures

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ELEMENT	PERFORMANCE CRITERIA	
	3.3	Corrective action is taken according to fault type in accordance with enterprise/site procedures
4 Complete documentation	4.1	Records are maintained and all events and operations are logged in accordance with enterprise procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence must show that knowledge has been acquired of safe working practices and interpretation and analysis of single operation protection devices.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

KS01-PO342B Interpret and analyse single operation protection devices

Evidence shall show an understanding of how to interpret and analyse the operation of single operation devices to an extent indicated by the following aspects:

T1 Introduction to protection schemes

- Functions of electrical protection schemes
- Features of electrical protection schemes
- Types of electrical faults
- Functions of mechanical protection schemes
- Features of mechanical protection schemes
- Types of mechanical faults
- Alarms and flags raised by protection devices

T2 Alternating Current (AC) motors

- Application of motors in electricity generating plants
- Three-phase motors
- Starter operations and applications
- Single-phase motor principles
- Construction of single-phase motors
- Synchronous motors
- Fault testing

T3 Electrical protection devices

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REQUIRED SKILLS AND KNOWLEDGE

- Fuses
- Thermal overload devices
- Over-temperature devices
- Over-current devices
- LV circuit breakers
- Over and under-voltage relays
- Re-setting or restoring electrical protection

T4 Mechanical protection devices

- Mechanical interlocks
  - Flow switches
  - Suction valve failures
- Re-setting or restoring mechanical protection

T5 Fault finding theory

- Linear approach (logical step-by-step sequential elimination of source of fault)
- Half-split rule (progressive isolation of the faulty system in halves until the fault is identified).
- Sensory detection (using senses of sight, sound, and smell to recognise faults).
- Continuity testing

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment	**9.1)**
	Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for

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apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this

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shall incorporate evidence that shows a candidate is able to:

- Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
- Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
- Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
- Demonstrate an appropriate level of employability skills
- Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures

- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Responding to protection equipment operation
  - Interpreting and determining cause of equipment operation
  - Restoring protection
  - Knowledge of protection equipment and schemes
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary

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evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment

9.4)

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note: Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the unit of competency as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Protection may include over current, over voltage/overload, bucholtz, winding

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RANGE STATEMENT

temperatures, and related L.V. protection.

Safety standards may include relevant sections of Occupational Health and Safety legislation, enterprise safety rules, relevant state and federal legislation and national standards for plant.

Information and documentation sources may include verbal or written communications; enterprise safety rules documentation; enterprise operating instructions; dedicated computer equipment; enterprise/site standing and operating instructions; enterprise log books; manufacturer operation and maintenance manuals; and equipment and alarm manuals.

Technical and operational indicators may include stimuli (audio, smell, touch, visual), local indicators and recorders, computers and alarms (visible and or audible).

Communications may be by means of telephone, two way radio, pager, computer (electronic mail) and operating logs (written or verbal).

Appropriate personnel for consultation, giving or receiving direction may include supervisor/team leader or equivalent, power plant operations personnel or equivalent, technical and engineering officers or equivalent, maintenance staff, other operating staff or equivalent, system controller/network controller, field operator, restricted H.V. operators, independent generators and customers.

Operating environment may be remote from plant and equipment being operated, (operation is assisted by remote indicators of plant status and other parameters monitored), during inclement or otherwise harsh weather conditions, in wet/noisy/dusty areas or during night periods.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations.

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UEPOPS343B Operate hydro-electric generating plant and auxiliary equipment

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to operate a hydro-electric generating station. This will include both the operational and maintenance activities associated with such plant.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety.

Pre-Requisites

Prerequisite Unit(s) **4)**

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Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Plan and Prepare Work	1.1	Occupational Health and Safety standards, statutory requirements, relevant Australian standards, codes of practice, manufacturers' specifications, environmental requirements and enterprise procedures are identified, applied and monitored throughout the work procedure.
	1.2	Work, plant and type of start requirements are identified from relevant personnel and documentation.
	1.3	Turbine running-up and loading schedules are ascertained from relevant documentation and in accordance with enterprise/site requirements.
	1.4	Localised plant and auxiliary equipment inspections, pre-operational tests and field preparation for service are carried out in accordance with manufacturer's and enterprise/site procedures.
	1.5	Plant and auxiliary equipment operational pre-requisites are established in accordance with manufacturer and enterprise/site procedures.
	1.6	Sequence for recommissioning of plant and auxiliary equipment is determined to suit existing circumstances in accordance with enterprise/site requirements.
	1.7	Where appropriate, the team's and individual's roles and responsibilities within the team are identified, and where required, assist in the provision of on-the-job training.
	1.8	Work is planned in detail including sequencing and prioritising and considerations made, where appropriate, for the maintenance of plant security and capacity in accordance with system/site requirements.
	1.9	Coordination requirements, including requests for isolations where appropriate, are resolved with others involved, affected or required by the

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ELEMENT		PERFORMANCE CRITERIA	
			work.
2	Operate and Monitor hydro plant	2.1	Plant is operated in accordance with enterprise and manufacturer operating procedures.
		2.2	Key indicator limits are maintained in accordance with manufacturer specifications and enterprise requirements.
		2.3	Auxiliary equipment is operated in accordance with enterprise and manufacturer operating procedures.
		2.4	Plant and auxiliary equipment is monitored and observed to detect deviations from normal operating conditions and system requirements.
		2.5	Plant and auxiliary equipment is operated within legislative requirements to gain maximum efficiency of energy conversion and to meet active and reactive dispatch power outputs.
		2.6	Corrective actions are taken to rectify any abnormalities in accordance with manufacturer's and enterprise/site procedures.
3	Test plant and auxiliary equipment operation	3.1	Tests are performed in accordance with defined procedures applicable to the test.
		3.2	Plant and equipment is observed for correct operational response.
		3.3	Corrective action is taken when response is not in accordance with documentation, plant integrity or personal safety requirements.
		3.4	Plant and equipment is returned to required operational status on completion of test.
4	Analyse plant and auxiliary equipment faults.	4.1	Causes of abnormal operating conditions are identified by analysing the technical and operational information in a logical and sequential manner.
		4.2	Actions necessary to rectify fault are determined.
		4.3	Plant integrity and personnel safety is

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ELEMENT	PERFORMANCE CRITERIA	
		maintained through consultation with appropriate personnel, and reference to plant, technical and operational documentation.
	4.4	Appropriate personnel are notified when defects are detected.
5 Complete documentation	5.1	Documentation is updated, maintained and equipment problems, movements, abnormalities and status are reported and logged in accordance with enterprise/site procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of operating hydro-electric generating plants and auxiliary equipment for a permit to work.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO343B Hydro-electric generating plant and auxiliary equipment

Evidence shall show that knowledge has been acquired for safe working practices of:

T1 Relevant environmental, occupational health and safety legislation and regulations

T2 Enterprise procedures

T3 Plant drawings and manufacturers manuals

T4 Introduction to and typical arrangements of hydro power production plant

T5 Relevant plant and equipment, its location and operating parameters

T6 Electric motor types and characteristics

T7 Pump and compressor types and characteristics

T8 Valve, damper and actuator types and characteristics

T9 Switchgear types and characteristics

T10 Electrical protection types and characteristics

T11 Electrical fundamentals

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REQUIRED SKILLS AND KNOWLEDGE

T12 Plant status

T13 Enterprise recording procedures

T14 Control and data acquisition systems

T15 Headgate, tailgate, intake, penstock, tunnels and tail races, types and characteristics

T16 Dam, types and characteristics

T17 Principles of hydro electric generation

T18 Hydro turbine, types and characteristics

T19 Hydro turbine governor, types and characteristics

T20 Hydro generator types and characteristics

T21 Bypass and relief valves, types and characteristics

T22 Transformers, types and characteristics

T23 Auxiliary plant, types and characteristics

T24 Speed control systems

T25 Electrical supply and distribution systems

T26 Lubrication systems and oil conditioning systems

T27 Equipment behaviours under the influence of high water pressure and/or flows

T28 Civil and hydraulic structures

T29 Governing, frequency, excitation, voltage, voltage phase and speed matching,synchronising, active and reactive power setting.

KS02-PO343B Hydro-electric generating plant and auxiliary equipment

Specific skills needed to achieve the Performance Criteria:

T1 Interpret plant drawings and manufacturers manuals

T2 Apply relevant state and territory regulations

T3 Apply enterprise recording procedures;

T4 Identify plant status;

T5 Prepare plant/equipment for operation

T6 Organise resources

T7 Apply diagnostic and testing techniques

T8 Identify and respond to abnormal plant operating conditions

T9 Plan and prioritise work

T10 Use relevant hand tools

T11 Communicate effectively

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REQUIRED SKILLS AND KNOWLEDGE

T12 Apply data analysis techniques and tools

T13 Operate equipment under the influence of high water pressures and/or flows

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing

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on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures;

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Enterprise/site emergency procedures

- Preparation and planning of work
- Operation of hydro turbine generator
- Operationally testing plant
- Analysing plant faults, Monitoring plant operation
- Work completion details
- Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items

Context of and specific resources for assessment **9.3)**

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note: Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated

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skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the unit of competency as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Plant and equipment may include turbines; turbines with underslung pumps; inlet valve, inlet bypass valve, scroll case and draft tube, relief valve, wicket gates or spear valve, gate swing ring or spear actuator, runner, turbine bearing; reversible turbines; auxiliary plant and equipment, including batteries, chargers, governor oil pumps, auxiliary generators, standby generators, air compressors, transformer and bearing cooling water pumps, pressure reducing valves, dewatering and sump pumps, seal water filters, bearing oil coolers, oil and water separators, fire detection and protection equipment; governor and associated hydraulic circuits; generator and auxiliary plant including main exciter, commutator, pilot exciter, voltage regulator, synchronising equipment, cooling systems, lube oil systems, seal systems, brake systems; computer with equipment control functions; supervisory, alarm and control equipment; electrical motors, fans and pumps; electrical supply and distribution systems; valves and dampers (electric, hydraulic, pneumatic and manual); lubrication and oil conditioning systems; static/rotating rectifiers; brush gear and slipring fire protection equipment; sliprings and commutators; AVR/AER; heat exchangers, filters and strainers; generators; transformers; water drainage systems; and environmental protective systems.

Safety standards may include relevant sections of Occupational Health and Safety legislation, enterprise safety rules, relevant state and federal legislation, national

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RANGE STATEMENT

standards for plant and Australian standards.

Information and documentation sources may include verbal or written communications; enterprise safety rules documentation; enterprise operating instructions; dedicated computer equipment; enterprise/site standing and operating instructions; enterprise log books; manufacturer operation and maintenance manuals; and equipment and alarm manuals.

Technical and operational indicators may include stimuli (audio, smell, touch, visual), remote or local indicators and recorders, computers and alarms (visible and or audible).

Tests may include motor direction checks, stand-by plant "cut-in" tests, relief valves operation tests, overspeed tests, main inlet valves/guide vanes timing tests, load rejection tests, governor damping tests and phrase rotation tests.

Communications may be by means of telephone, two way radio, pager, computer (electronic mail) and operating logs (written or verbal).

Appropriate personnel to consult, give or receive direction may include, supervisor/team leader or equivalent, engineering officer/hydro maintenance office or equivalent, technical and engineering officers or equivalent, contractor staff, maintenance staff, applicable water control authority or equivalent and "transgrid" operator or equivalent.

Test, fault finding and operating tools may include low and high voltage testers, proving dead equipment, powered or non-powered hand tools.

Operating environment may be remote from plant, aided by indicators and monitors, during inclement or otherwise harsh weather conditions, in wet/noisy/dusty/hot areas, during night periods or locally aided by visual and audible indicators.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations.

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UEPOPS344B Conduct water conveyance and control

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required for the operation of storage, conveyance and control systems of hydro generation water supplies.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships.

Pre-Requisites

Prerequisite Unit(s) **4)**

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Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Plan and Prepare	1.1	Occupational Health and Safety standards, statutory requirements, relevant Australian standards, codes of practice, manufacturers' specifications, environmental requirements and enterprise procedures are identified, applied and monitored throughout the work procedure.
	1.2	Work requirements are identified and clarified/confirmed with appropriate parties or by site inspection.
	1.3	Resources required to satisfy the work plan are identified and obtained in accordance with enterprise/site procedures.
	1.4	Potential hazards are identified and prevention and/or control measures are selected in accordance with the work plan and site procedures.
	1.5	Work is planned in detail including sequencing and prioritising and considerations made, where appropriate, for the maintenance of plant security and capacity in accordance with system/site requirements.
	1.6	Coordination requirements, including requests for isolations where appropriate, are resolved with others involved, affected or required by the work.
	1.7	Where appropriate, the teams' and individuals' roles and responsibilities within the team are identified, and where required, assist in the provision of on-the-job training.
2 Supply Water for Power Generation	2.1	Inspections of storage and conveyance systems are scheduled and problems are reported and monitored in accordance with enterprise/site requirements.
	2.2	Water quality is monitored and recorded in accordance with enterprise/site requirements

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ELEMENT		PERFORMANCE CRITERIA	
		2.3	Flow regulating systems are monitored and adjusted to meet generation needs and other user requirements in accordance with enterprise procedures.
		2.4	Flows are monitored and where appropriate diversions are determined to facilitate maintenance or emergency activities.
		2.5	Dam surveillance procedures are performed in accordance with enterprise/site requirements.
		2.6	Dam levels are maintained/monitored in accordance with system/site requirements.
		2.7	Functional tests of equipment are undertaken in accordance with manufacturers' specifications and enterprise/site requirements.
3	Implement Flood Control Procedures	3.1	Potential flood conditions are determined using data collected and reports communicated in accordance with enterprise procedures.
		3.2	Flood control procedures are implemented in accordance with enterprise procedures.
		3.3	Flood control outcomes are monitored and recorded/reported to appropriate personnel and reviewed in accordance with enterprise procedures.
4	Complete Documentation	4.1	Documentation is updated, maintained and equipment problems, movements, abnormalities and states are reported and logged in accordance with enterprise/site procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of conducting water

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REQUIRED SKILLS AND KNOWLEDGE

conveyance and controls

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO344B Water conveyance and control

Evidence shall show that knowledge has been acquired for safe working practices of:

T1 Relevant environmental, occupational health and safety legislation and regulations

T2 Enterprise procedures

T3 Plant drawings and manufacturers manuals

T4 Introduction to and typical arrangements of hydro power production plant

T5 Relevant plant and equipment, its location and operating parameters

T6 Electric motor types and characteristics

T7 Pump and compressor types and characteristics

T8 Valve, damper and actuator types and characteristics

T9 Switchgear types and characteristics

T10 Electrical protection types and characteristics

T11 Electrical fundamentals

T12 Relevant state and territory regulations

T13 Headgate, tailgate, intake, penstock, tunnels and tail races, types and characteristics

T14 Dam, types and characteristics

T15 Principles of hydro electric generation

T16 Hydro turbine, types and characteristics

T17 Hydro turbine governor, types and characteristics

T18 hydro generator types and characteristics

T19 bypass and relief valves, types and characteristics

T20 transformers, types and characteristics

T21 auxiliary plant, types and characteristics

T22 System hydraulics; coordination processes

T23 System supplies layout

T24 Relevant utilities and service bodies

T25 Equipment operation, capacity and limitations

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REQUIRED SKILLS AND KNOWLEDGE

T26 Affect of weather and conditions on operation of water storage/conveyance systems

T27 Control systems.

KS02-PO344B Water conveyance and control

T1 Specific skills needed to achieve the Performance Criteria:

T2 Interpret plant drawings and manufacturers manuals

T3 Apply relevant state and territory regulations

T4 Apply enterprise recording procedures

T5 Plan and prioritise work

T6 Communicate effectively

T7 Respond to abnormal operating conditions

T8 Apply testing and diagnostic techniques

T9 Manage water control systems.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment	**9.1)**
	Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is

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recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and

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Range Statement

- Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
- Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
- Demonstrate an appropriate level of employability skills
- Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures

- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Preparation and planning of work
  - Management of water supplies for hydro generation
  - Implementation of flood control
  - Documentation and reporting procedures.
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment',

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evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment

9.4)

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note: Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the unit of competency as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Safety standards may include relevant sections of Occupational Health and Safety legislation, enterprise safety rules, relevant state and federal legislation, national standards for plant, standard operating procedures, local by-laws, environmental protection.

Appropriate personnel to consult, give or receive direction may include power plant

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RANGE STATEMENT

operator/system controllers or equivalent, technical and engineering officers or equivalent, maintenance staff, other authorities, general public.

Information and documentation sources may include verbal or written communications, enterprise safety rules and operating instruction documentation, manufacturers' operating and maintenance manuals, log books, dedicated computer equipment, protection and alarm manuals.

Communications may be by means of telephone, two way radio, dedicated computer equipment, logs.

Equipment may include: lakes, dams, intakes/regulating gates spillways, intake gates, canals/flumes, tunnels, penstocks, hill top valves (HTV), tail race, riparian water, dewatering outlets, surge towers/shafts/ponds, pumping stations, discharge valves, pumping systems, on and off road vehicles.

System limitations may include weather conditions, environmental requirements, minimum operating levels, statutory requirement, community service obligations.

Functional tests may be carried out on mechanical/electrical and static devices.

Flood control procedures may include implementation of local area flood procedures, operation of dewatering outlets.

Technical and operational indicators may include remote or local indicators and recorders, computers and alarms (visible and/or audible).

Work completion details may include enterprise recording procedures (electronic or hard copy), environmental reports, personnel training reports.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations

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UEPOPS345B Implement dam safety surveillance procedures

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required for the scheduling, implementation and reporting of dam safety surveillance.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. Work in this unit is typically carried out under broad or limited guidance

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety.

Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

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Prerequisite Unit(s) **4)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and Prepare for dam surveillance	1.1 Occupational Health and Safety standards, statutory requirements, relevant Australian standards, codes of practice, manufacturers' specifications, environmental requirements and enterprise procedures are identified, applied and monitored throughout the work procedure.
	1.2 Resources required to satisfy the work plan are identified and obtained in accordance with enterprise procedures.
	1.3 Coordination requirements are resolved with others involved, affected or required by the work.
	1.4 International and national guidelines for dam surveillance together with appropriate regulatory requirements are interpreted and adopted.
	1.5 Monitoring frequency and sites for dam surveillance are determined in accordance with site requirements.
	1.6 Instrument requirements and data collection methods are identified in accordance with enterprise/site procedures.
2 Implement Dam Safety Surveillance	2.1 Dam safety surveillance procedures are implemented in accordance with enterprise procedures.
	2.2 Data from instruments and personnel is collected and processed in accordance with enterprise procedures.
	2.3 Test and measurement instruments are used in accordance with manufacturers' instructions and site requirements.
	2.4 Abnormal conditions/defects are identified and reported to the appropriate personnel in accordance with enterprise/site requirements.
3 Complete Safety	3.1 Calibration of instruments checked after each use in accordance with manufacturers'

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ELEMENT	PERFORMANCE CRITERIA	
Surveillance Reports		specification and site requirements.
	3.2	Dam surveillance reporting and documentation is undertaken in accordance with enterprise/statutory and site procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of implementing dam safety surveillance procedures for a permit to work.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO345B Dam safety surveillance procedures

Evidence shall show that knowledge has been acquired for safe working practices of:

T1 Relevant environmental, occupational health and safety legislation and regulations

T2 Enterprise procedures

T3 Plant drawings and manufacturers manuals

T4 Introduction to and typical arrangements of hydro power production plant

T5 Relevant plant and equipment, its location and operating parameters

T6 Relevant state and territory regulations

T7 Dam, types and characteristics

T8 Properties of stored water

T9 Dam design principles

T10 Materials science, e.g. corrosion, paint coating

T11 Relevant utilities

T12 Principles of hydraulics

T13 Principles of soil mechanics

T14 Concrete structure, strengths and deterioration

T15 Construction procedures; safe dam operating procedures

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REQUIRED SKILLS AND KNOWLEDGE

T16 Principles of dam surveillance

T17 Risk management techniques

T18 Maintenance practices

KS02-PO345B Dam safety surveillance procedures

Specific skills needed to achieve the Performance Criteria:

T1 Interpret plant drawings and manufacturers manuals

T2 Apply relevant state and territory regulations

T3 Analysis

T4 Data processing

T5 Communication

T6 Use of equipment and instruments

T7 Interpretation of plans and charts

T8 Production of reports

T9 Inspection skills

T10 Operation of instruments.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment	**9.1)**
	Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment

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is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:

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- Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
- Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
- Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
- Demonstrate an appropriate level of employability skills
- Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures

- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Preparation and planning of work
  - Implementation of surveillance procedures
  - Actions taken in response to findings
  - Care of test/recording equipment
  - Data collection methods
  - Enterprise documentation procedures
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace

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conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment

9.4)

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note: Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the unit of competency as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work

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RANGE STATEMENT

environments and situations that will affect performance.

Surveillance sites may include earthen walls; concrete walls; hydraulic structures; electrical equipment; spillways; outlets; pipes; conduits; foundations; mechanical equipment (gates/valves); reservoir perimeter; weirs; tunnels/galleries.

Historical information may include past surveillance reports; observation and associated comments/reports; original design plans; design modifications; construction records and reports; survey information.

Data recorded and utilised may include but is not limited to current and past monitoring records; flood information; seismic details; previous safety reviews; geological/foundation investigation reports; hydrological reports; past remedial works; past incidents; past surveillance reports; inspection reports; original design plans; design modifications; construction records and reports; O and M performance data.

Instruments may include simple manual devices through to complex computer controlled systems.

Inspections may include interaction and communication with employees/general public; visual observation; use of electronic and/or computer equipment; operational preparedness checks; specialist inspections.

Organisational and statutory requirements may include environmental laws and policies; by-laws or organisational policy; water acts; construction and Occupational Health and Safety regulations; public safety and disaster plans; ICOLD and ANCOLD guidelines; state government or state committees; asset management plan.

Stakeholders may include dam owners; water authorities; government; water consumers; downstream land owners; meteorological bureau; local government; emergency organisations; police; land care/water watch groups; industry.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations

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UEPOPS346B Conduct non-routine operational testing

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This competency standard unit deals with the skills and knowledge required to conduct testing of generation plant and associated equipment which may be of a non-routine nature.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships.

Pre-Requisites

Prerequisite Unit(s) **4)**

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Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare for testing	1.1 Safety issues are identified and complied with in accordance with enterprise/site and legislative requirements
	1.2 Needs and outcomes for the tests are defined in accordance with work requirements
	1.3 Test procedures are determined and monitoring equipment requirements are defined in accordance with the test objectives
	1.4 Availability and access to plant is determined in accordance with work requirements
	1.5 Coordination requirements, including requests for isolations where appropriate, are resolved with others involved, affected or required by the testing procedure
	1.6 Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2 Conduct non-routine testing	2.1 Testing is performed in accordance with relevant sections of enterprise, state or national standards and codes of practise
	2.2 Required isolations are confirmed where appropriate in accordance with enterprise/site requirements
	2.3 Testing is performed in accordance with defined procedures application to the test
	2.4 Plant is observed and corrective action taken when response is not in accordance with plant operating parameters/plant integrity or personnel safety
	2.5 Testing completed, permits relinquished where appropriate, and plant returned to required operational status

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ELEMENT	PERFORMANCE CRITERIA	
3 Complete the work	3.1	Appropriate personnel notified of the completion of testing in accordance with enterprise/site procedures
	3.2	Plant problems or abnormalities are reported and logged in accordance with enterprise/site procedures
	3.3	Test results/observations are interpreted and documented in accordance with enterprise/site procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of conducting non-routine operational testing.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO346B Non-routine operational testing

Evidence shall show that knowledge has been acquired for safe working practices of:

T1 Relevant environmental, occupational health and safety legislation and regulations

T2 Enterprise procedures

T3 Plant drawings and manufacturers manuals

T4 Introduction to and typical arrangements of power production plant

T5 Relevant plant and equipment, its location and operating parameters

T6 Relevant state and territory regulations

T7 Plant status

T8 Testing procedures and techniques

T9 Enterprise recording procedures

KS02-PO346B Non-routine operational testing

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REQUIRED SKILLS AND KNOWLEDGE

Specific skills needed to achieve the Performance Criteria:

T1 Interpret plant drawings and manufacturers manuals

T2 Apply relevant state and territory regulations

T3 Locate relevant plant and equipment

T4 Identify plant status

T5 Recognise abnormal plant operating conditions

T6 Restore normal operating conditions

T7 Apply testing techniques and procedures

T8 Use testing equipment

T9 Communicate effectively

T10 Apply data analysis techniques and tools.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord

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with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as

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specified in the Performance Criteria and Range Statement
    - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
    - Demonstrate an appropriate level of employability skills
    - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
    - Knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
    - Preparation and planning of work
    - Testing techniques and procedures
    - Operational requirements of the plant and/or associated equipment
    - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of

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environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note: Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the unit of competency as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Generation plant and/or equipment may include turbines and generators; mills; fans; pumps; heat exchangers; fired and unfired pressure vessels; motors; transformers; switchgear; pneumatic, hydraulic and electrical/electronic control systems; cooling systems; and chemical treatment and water quality systems.

Relevant standards may include sections of Occupational Health and Safety legislation, enterprise safety rules and procedures, relevant state and federal legislation, national standards or codes of practices for plant.

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RANGE STATEMENT

Information and documentation sources may include verbal or written communications; enterprise safety rules documentation; equipment and alarm manuals; dedicated computer equipment; drawings, logic diagrams; plant records; enterprise/site log books; and manufacturer operation and maintenance manuals.

Testing may include commissioning of newly installed plant or equipment/ post maintenance tests, QA/QC tests and fault finding procedures.

Test results may be conveyed to supervisor/team leader or equivalent; technical and engineering officers or equivalent; power system control personnel or equivalent; maintenance staff; power plant operations staff personnel; contractor and external specialist personnel.

Testing environment may be remote from plant; aided by indicators and monitors; during inclement or otherwise harsh weather conditions; wet/noisy/dusty areas; during night periods; and in confined spaces.

Test equipment may include calculators, thermocouples, multimeters, flow meters, stopwatch, check sheets, data logger, power or hand tools.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations.

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UEPOPS347B Operate and monitor supervisory, control and data acquisition systems

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to undertake monitoring and operation of screen based supervisory, control and data acquisition systems.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

This unit is not suitable for work entry and is intended for building upon competencies previously acquired.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the

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Evidence Guide.

Elements and Performance Criteria

ELEMENT		PERFORMANCE CRITERIA	
1	Operate screen displays	1.1	Safety issues are identified in accordance with enterprise/system requirements
		1.2	System requirements are identified from relevant personnel and documentation
		1.3	Screen displays and applications are identified and retrieved in accordance with system requirements
		1.4	Functions available from the screen based equipment are identified and selected in accordance with system procedures
		1.5	Functions available from the screen based equipment are utilised in accordance with system requirements
		1.6	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2	Monitor and interpret information	2.1	Screen displays are monitored in accordance with enterprise/system procedures
		2.2	Abnormal values are identified by analysis of information obtained from screen displays in accordance with enterprise/system procedures
		2.3	Corrective action taken is in accordance with enterprise/system procedures
		2.4	Alarms are acknowledged, prioritised and responded to in accordance with enterprise/system procedures
3	Enhance screen display	3.1	Requirements for the development of new screen displays are identified and confirmed in accordance with system requirements

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ELEMENT	PERFORMANCE CRITERIA
	3.2 New screen displays are researched, assessed and confirmed with appropriate personnel in accordance with system requirements

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence must show that knowledge has been acquired of safe working practices and supervisory, control and data acquisition (SCADA) systems.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

KS01-PO347B Supervisory, control and data acquisition (SCADA) systems.

Evidence shall show an understanding of how to use supervisory, control and data acquisition (SCADA) systems, to an extent indicated by the following aspects:

T1 Windows Operating System

- Starting up and logging on to the operating system
- Windows desktop
- ‘Point-and-click’ and ‘click-and-drag’ functionality of Windows.
- Clipboard
- Icons
- Applications
- Minimising, maximising and arranging windows
- Memory and memory devices
- Saving and backing up data
- Printing from Windows and Windows applications

T2 Instrumentation theory

- Process switches
- Pressure gauges
- Pressure switches
- Thermocouples
- Vibration sensors
- Transmitters

T3 Remote telemetry and data acquisition

- Remote Terminal Units

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REQUIRED SKILLS AND KNOWLEDGE

- Programmable Logic Controllers (PLCs)
- Communication network

T4 SCADA Systems

- Human Machine Interface (HMI)
- Mimic diagrams
- SCADA ‘Historian’ database
- Tags (points)
- Trending
- Diagnostic data
- Commands and functions
- Drawing program
- Alarm points
- Alarm indicators
- Alarm events
- Server
- Redundancy
- Index searching

T5 Distributed Control Systems (DCS)

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry’s preferred model for

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apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this

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shall incorporate evidence that shows a candidate is able to:

- Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
- Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
- Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
- Demonstrate an appropriate level of employability skills
- Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures

- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - The full range of displays and applications available is explained
  - Operation of screed based equipment
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of

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work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment

9.4)

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note: Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the unit of competency as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Safety standards may include relevant sections of Occupational Health and Safety legislation, enterprise safety rules, relevant state and federal legislation and national

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RANGE STATEMENT

standards for plant.

Information and documentation sources may include verbal or written communications; enterprise safety rules documentation; enterprise operating instructions; dedicated computer equipment; enterprise/site standing and operating instructions; enterprise log books; manufacturer operation and maintenance manuals; and equipment and alarm manuals.

Communications may be by means of telephone, two way radio, pager, computer (electronic mail) and operating logs (written or verbal).

Appropriate personnel to consult, give or receive direction may include supervisor/team leader or equivalent, power plant operations personnel or equivalent, technical and engineering officers or equivalent, maintenance staff, other operating staff or equivalent, system controller/network controller, field operator and restricted HV operators.

Operating environment may be remote from plant and equipment being operated.

Displays and functions may include trends, alarms, generation plant, fuel supplies, remote plant and equipment, substations, power distribution network, transmission network, stakeholder systems, multiple screens, multiple windows, linkage between screens, trending facilities, index searches, formats, colours, tags, key commands, dedicated keys and alarms.

Faults and abnormal operating conditions may include hardware and software faults and system failures.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations.

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UEPOPS349B Operate Local H.V. switchgear

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This competency standard unit deals with the skills and knowledge required to undertake the local operation of high voltage circuit breaking devices

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships.

Pre-Requisites

Prerequisite Unit(s) **4)**

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Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare to operate switchgear	1.1 Work requirements are identified and clarified/confirmed with appropriate parties in accordance with enterprise procedures
	1.2 Procedures/safety precautions when operating H.V. circuit breakers are identified and recognised in accordance with enterprise procedures
	1.3 Identify circuit breaker type and determine correct operating procedure in accordance with enterprise procedures
	1.4 Examine and assess circuit breaker condition for safe operation in accordance with enterprise procedures
	1.5 Suppress related protection if and where necessary in accordance with enterprise procedures
	1.6 Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2 Operate circuit breaker	2.1 Mechanical operation and limitations of the equipment are identified in accordance with enterprise procedures
	2.2 Implications of actions are identified and recognised in accordance with enterprise procedures
	2.3 Circuit breaker is operated and confirmation that required status has been achieved is given in accordance with enterprise procedures
	2.4 Racking, testing, isolation, circuit earthing and reinstatement procedures are carried out to manufacturer instructions and enterprise/site procedures
	2.5 Confirm test equipment integrity and prove

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ELEMENT		PERFORMANCE CRITERIA	
			circuit de-energised in accordance with operating procedures
3	Validate circuit breaker integrity	3.1	Equipment inspected for safe operation in accordance with enterprise procedures
		3.2	Circuit breaker environment is inspected to ensure all statutory requirements are met
		3.3	Confirm circuit breaker operates in accordance with manufacturer specifications
4	Complete documentation	4.1	Documentation is updated, log sheets maintained and plant problems, movements, abnormalities and status are reported and logged in accordance with enterprise/site procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of operating H.V. switchgear.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO349B Local H.V. switchgear

Evidence shall show that knowledge has been acquired for safe working practices of:

T1 Relevant environmental, occupational health and safety legislation and regulations

T2 Enterprise procedures

T3 Plant drawings and manufacturers manuals

T4 Introduction to and typical arrangements of power production plant

T5 Relevant plant and equipment, its location and operating parameters

T6 Switchgear types and characteristics

T7 Electrical protection types and characteristics

T8 Electrical fundamentals

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REQUIRED SKILLS AND KNOWLEDGE

T9 Relevant state and territory regulations

T10 Electrical protection equipment, types and characteristics

T11 Plant status;

T12 Circuit breaker operating parameters;

T13 Consequences of operator actions;

T14 H.V electrical operation procedure and practices

T15 Personal protective equipment requirements for H.V. circuit breaker operation

T16 H.V. power systems and parameters;

T17 H.V. protection schemes;

T18 Enterprise procedures;

T19 Circuit breaker construction and operation;

T20 Isolation and earthing procedures;

KS02-PO349B Local H.V. switchgear

Specific skills needed to achieve the Performance Criteria:

T1 Interpret plant drawings and manufacturers manuals

T2 Apply relevant state and territory regulations

T3 Apply relevant statutory legislation;

T4 Apply relevant enterprise/site safety procedures;

T5 Apply enterprise/site emergency procedures and techniques;

T6 Apply enterprise recording procedures;

T7 Locate relevant plant and equipment;

T8 Operate circuit breaker within design parameters;

T9 Identify plant status;

T10 Prepare equipment for operation;

T11 Communicate effectively;

T12 Recognise abnormal circuit breaker operation;

T13 Plan and prioritise work;

T14 Operate protection equipment;

T15 Isolate and earth equipment

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Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

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Critical aspects of evidence required to demonstrate competency in this unit **9.2)**

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Preparation for primary switchgear operations
  - Operation and knowledge of circuit breakers
  - Implications of circuit breaker operations
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items

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Context of and specific resources for assessment **9.3)**

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note: Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

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There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the unit of competency as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Equipment may include circuit breaker (vacuum, oil, gas, air), isolators, earth switches, earthing trucks, earthing and discharge equipment, gloves, testers, phasing sticks, computers with equipment control functions; capacitor/condenser banks, protection settings, alarm and control equipment. (Personal safety equipment). Any LV that directly impacts on HV switching (e.g. VT's).

Safety standards may include relevant sections of Occupational Health and Safety legislation, enterprise safety rules, relevant state and federal legislation and national standards for plant.

Information and documentation sources may include verbal or written communications; single line drawings; schematics; enterprise safety rules documentation; enterprise operating instructions; dedicated computer equipment; enterprise/site standing and operating instructions; enterprise log books; manufacturer operation and maintenance manuals; and equipment and alarm manuals.

Technical and operational indicators may include stimuli (audio, smell, touch, visual), local indicators and recorders, computers and alarms (visible and or audible).

Communications may be by means of telephone, two way radio, pager, computer (electronic mail), operating logs (written or verbal) and intercoms.

Appropriate personnel for consultation, to give or receive direction may include supervisor/team leader or equivalent, power plant operations personnel or equivalent, technical and engineering officers or equivalent, maintenance staff, other operating staff or equivalent, system controller/network controller, field operator and restricted H.V. operators.

Implications may be safety of personnel and public, damage to equipment, loss of plant, legal implications, system integrity, capital cost, lost enterprise revenue and community costs.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information

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RANGE STATEMENT

and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations.

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UEPOPS351B Operate H.V. condition changing apparatus

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to undertake the local operation of all high voltage condition modifying devices.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships.

Pre-Requisites

Prerequisite Unit(s) **4)**

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Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Prepare for operations	1.1	Procedures and safety requirements/limits for operating condition changing devices are adhered to in accordance with manufacturers enterprise/site and statutory requirements
	1.2	Location of apparatus is determined from plans, drawings, system diagrams and where appropriate maps
	1.3	Device to be operated is identified and confirmed
	1.4	Condition and status of apparatus to be safely operated is determined visually
	1.5	Prepare device for operation in accordance with enterprise procedures
	1.6	Device to be operated is verified with key stake holders, using appropriate procedures and guidelines, in accordance with enterprise policy
	1.7	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2 Operate condition changing device	2.1	Contact with stake holders is maintained throughout and communication is concise and clear
	2.2	System conditions are evaluated prior to operation in accordance with enterprise procedures
	2.3	Device is operated to manufacturer instructions and enterprise policy and guidelines in accordance with enterprise procedures
	2.4	Device is controlled and adjusted in order to alter system conditions to achieve desired outcome
	2.5	Apparatus is examined to ensure device has

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ELEMENT	PERFORMANCE CRITERIA	
		functioned correctly
	2.6	System conditions are re-evaluated to confirm desired outcome
	2.7	Apparatus is secured in accordance with operational procedure and policy
	2.8	Confirmation procedure is conducted after operation in accordance with enterprise policy
3 Complete documentation	3.1	Documentation is updated; equipment problems, movements, abnormalities and status are reported and logged in accordance with enterprise/site procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of conducting single energy source isolation procedures.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO351B H.V. condition changing apparatus

Evidence shall show that knowledge has been acquired for safe working practices of:

T1 Relevant environmental, occupational health and safety legislation and regulations

T2 Enterprise procedures

T3 Plant drawings and manufacturers manuals

T4 Introduction to and typical arrangements of power production plant

T5 Relevant plant and equipment, its location and operating parameters

T6 Switchgear types and characteristics

T7 Electrical protection types and characteristics

T8 Electrical fundamentals

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REQUIRED SKILLS AND KNOWLEDGE

T9 Relevant state and territory regulations

T10 Condition changing apparatus, types and characteristics

T11 Plant status

T12 Enterprise recording procedures

T13 H.V. systems and interconnected circuitry

KS02-PO351B H.V. condition changing apparatus

Specific skills needed to achieve the Performance Criteria:

T1 Interpret plant drawings and manufacturers manuals

T2 Apply relevant state and territory regulations

T3 Apply enterprise recording procedures

T4 Operate equipment within design parameters

T5 Identify plant status

T6 Prepare equipment for operation

T7 Communicate effectively

T8 Recognise abnormal switch gear operation

T9 Plan and prioritise work

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment	**9.1)**
	Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment

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intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline,

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work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:

- Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
- Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
- Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
- Demonstrate an appropriate level of employability skills
- Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures

- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Preparing for operating apparatus
  - Operating H.V. apparatus
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of

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work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment

9.4)

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note: Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the unit of competency as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Apparatus/devices may include on load transformer tap changers, off load transformer tap changers, capacitor banks, rotary converters, voltage regulators, reactors current

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RANGE STATEMENT

limiters, rectifiers and transformers.

Safety standards may include relevant sections of Occupational Health and Safety legislation, enterprise safety rules, relevant state and federal legislation and national standards for plant.

Information and documentation sources may include verbal or written communications; enterprise safety rules documentation; enterprise operating instructions; dedicated computer equipment; enterprise/site standing and operating instructions; enterprise log books; manufacturer operation and maintenance manuals; and equipment and alarm manuals.

Technical and operational indicators may include stimuli (audio, smell, touch, visual), local indicators and recorders, computers and alarms (visible and or audible).

Communications may be by means of telephone, two way radio, pager, computer (electronic mail), operating logs (written or verbal) and intercom.

Appropriate personnel for consultation, to give or receive direction may include supervisor/team leader or equivalent, power plant operations personnel or equivalent, technical and engineering officers or equivalent, maintenance staff, other operating staff or equivalent, system controller/network controller, field operator and restricted H.V. operators

Operating environment may be remote from plant and equipment being operated (operation is assisted by remote indicators of plant status and other parameters monitored), during inclement or otherwise harsh weather conditions, in wet/ noisy/dusty areas or during night periods.

System parameters may include voltage, current, frequency, VAR load and equipment capability.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations.

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UEPOPS352B Conduct operational checks on in-service mechanical plant

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to conduct operational checks on in-service mechanical plant.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety.

Pre-Requisites

Prerequisite Unit(s) **4)**

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Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan for plant in-service checks	1.1 Safety issues are identified to comply with enterprise/site requirements
	1.2 Work, plant and resource requirements are identified from relevant information, requests, work orders or equivalent and documentation.
	1.3 Plant status and work requirements are clarified/confirmed with appropriate parties or by site inspection
	1.4 Equipment is check for correct calibration, operation. correct size, type and quantity of materials/components are determined, obtained and inspected for compliance with the job specifications
	1.5 Potential hazards are identified and prevention and/or control measures are selected in accordance with the work plan and site procedures
	1.6 Pre access checks are carried out in accordance with enterprise and site requirements
	1.7 Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2 Carry out in-service mechanical checks	2.1 Systems / plant is operated in accordance with enterprise/site and manufacturer operating procedures
	2.2 in-service mechanical checks are done in conjunction with others involved in, or affected by, the work in accordance with the work plan
	2.3 Plant checks are monitored and observed to detect deviations from normal operation
	2.4 Corrective actions are taken to rectify abnormalities in accordance with manufacturer and enterprise/site procedures

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ELEMENT	PERFORMANCE CRITERIA	
	2.5	In-service checks are performed in accordance with defined enterprise procedures.
	2.6	System/plant integrity and personnel safety are maintained through consultation with appropriate personnel, and reference to plant, technical and operational documentation
3 Complete the work	3.1	When checks are completed, control measures are returned to required operational status where appropriate.
	3.2	Appropriate personnel are notified of the completion of work in accordance with enterprise/site procedures
	3.3	Plant problems or abnormalities are reported and logged in accordance with enterprise/site procedures
	3.4	check results are interpreted and documented in accordance with enterprise/site procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence must show that knowledge has been acquired of safe working practices and mechanical plant in-service operations checks.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

KS01-PO352B Mechanical plant in-service operational checks Evidence shall show an understanding of how to conduct operational checks on in-service mechanical plant to an extent indicated by the following aspects:

T1 Instruction sheets, including:

- Enterprise, state or national standards
- Enterprise-specific work instructions or job sheets
- Manufacturers' operating instructions and manuals
- Plant drawings

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REQUIRED SKILLS AND KNOWLEDGE

- Equipment checklists

T2 Perform inspection of plant equipment associated with electricity generating plants by use of sight, sound and smell.

Types of equipment includes:

i. pressure vessels

ii. fans

iii. pumps

iv. pipe work

v. valves and fittings

vi. wind turbine hydraulic systems

vii. chemical and water treatment processes

viii. pneumatic air systems

ix. water cooling mechanical equipment

x. heat exchangers

xi. induced draft fan mechanical equipment

xii. fuel delivery system

Checks include:

i. fault finding

ii. minor performance checking and testing

iii. general condition

iv. corrosion

v. correct positioning and settings

vi. leaks

- water
- steam
- oil
- air

vii. oil and lubrication requirements

viii. noise and vibration

ix. odours

T3 Assess the operation of electrical plant by use of a range of indicators, including:

i. Analogue displays

ii. Digital displays

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REQUIRED SKILLS AND KNOWLEDGE

iii. Fluid flows

iv. Protection settings

v. Load capabilities

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

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Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory

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legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures

- Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment

9.4)

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.Note: Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

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Concurrent assessment and relationship with other units	**9.5)**
	There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.
	Nil

Range Statement

RANGE STATEMENT

10) This relates to the unit of competency as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Operational Checks may include fault finding, performance checking. Indication and protection checks and work on control and trip circuits and minor testing.

Key indicators may include plant temperatures, fluid flows, plant load capabilities, protection settings, visual and audible indicators, analogue and digital displays.

Plant and/or equipment may include turbines and generators; fans; pumps; heat exchangers; fired and unfired pressure vessels; couplings; pneumatic, hydraulic control systems; cooling systems; and chemical treatment and water quality systems, fuel delivery system; fire protection system; Safety standards may include relevant sections of Occupational Health and Safety legislation, enterprise safety rules, national standards for plant, relevant state and federal legislation and Australian standards.

Information and documentation sources may include verbal or written communications; enterprise safety rules documentation; enterprise operating instructions; equipment and alarm manuals; dedicated computer equipment; enterprise standing instructions and plant notes; enterprise log books; manufacturer operation and maintenance manuals.

Technical and operational indicators may include stimuli (audio, smell, touch, visual), remote or local indicators and recorders, computers and alarms (visible and or audible).

Appropriate personnel for consultation, to give or receive direction may include supervisor/team leader or equivalent; other coordinators of energy production; other operating staff; technical and engineering officers or equivalent; maintenance personnel; and contractor staff.

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RANGE STATEMENT

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations.

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UEPOPS354B Operate and monitor dual fuel firing plant

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required for the operation, inspection and monitoring of dual fuel firing plant in which each fuel source is capable of providing 100% Maximum Continuous Rating.

Application of the Unit

Application of the Unit **2)**

The dual fuel firing plant must provide the means for attaining 100% maximum continuous rating and not simply be an alternative source of fuel for ignition purposes.

This unit is intended to augment formally acquired competencies.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the

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Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Plan and prepare work	1.1	Safety issues are identified to comply with enterprise/site requirements
	1.2	Work requirements are identified from relevant personnel and documentation
	1.3	Documentation to determine plant status is assessed and evaluated
	1.4	Localised plant inspection, pre-operational tests and field preparations for service are carried out in accordance with manufacturer and enterprise/site procedures
	1.5	Plant operational pre-requisites are established in accordance with manufacturer and enterprise/site procedures
	1.6	Sequence for recommissioning of plant is determined to suit existing circumstances in accordance with enterprise/site requirements
	1.7	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2 Operate plant	2.1	Plant is operated in accordance with enterprise and manufacturer operating procedures
	2.2	Changeover from one fuel source to the other is conducted with minimal effect on load and steam conditions
	2.3	Plant is monitored and observed to detect deviations from normal operating conditions
	2.4	Corrective actions are taken to rectify abnormalities in accordance with manufacturer and enterprise/site procedures

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ELEMENT		PERFORMANCE CRITERIA	
3	Test plant operation	3.1	Tests are performed in accordance with defined procedures applicable to the operational test
		3.2	Plant is observed for correct operational response
		3.3	Corrective action is taken when response is not in accordance with documentation, plant integrity or personnel safety requirements
		3.4	Plant is returned to required operational status upon completion of test
4	Analyse plant faults	4.1	Causes of abnormal plant operating conditions are identified by analysing the technical and operational information in a logical and sequential manner
		4.2	Corrective action taken is in accordance with enterprise procedures
		4.3	Plant integrity and personnel safety is maintained through consultation with appropriate personnel, and with reference to plant, technical and operational documentation
5	Monitor and inspect plant	5.1	Plant to be monitored/inspected is physically identified
		5.2	Plant is monitored/inspected for normal operation or to detect deviations
		5.3	Corrective action taken is in accordance with enterprise procedures
		5.4	Appropriate personnel are notified when defects are detected
6	Complete documentation	6.1	Documentation is updated and plant problems, movements, abnormalities and status are reported and logged in accordance with enterprise/site procedures

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of operating and monitoring dual fuel firing plant.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO354B Dual fuel firing plant

Evidence shall show that knowledge has been acquired for safe working practices of:

T1 Relevant environmental, occupational health and safety legislation and regulations

T2 Enterprise procedures

T3 Plant drawings and manufacturers manuals

T4 Introduction to and typical arrangements of power production plant

T5 Relevant plant and equipment, its location and operating parameters

T6 Electric motor types and characteristics

T7 Pump and compressor types and characteristics

T8 Valve, damper and actuator types and characteristics

T9 Switchgear types and characteristics

T10 Electrical protection types and characteristics

T11 Electrical fundamentals

T12 Relevant state and territory regulations

T13 Fuels and the combustion processes

T14 Plant status

T15 Enterprise recording procedures

T16 Control and data acquisition systems

T17 Supervisory, alarm, protection and control equipment

T18 Fan types and Characteristics

KS02-PO354B Dual fuel firing plant

Specific skills needed to achieve the Performance Criteria:

T1 Interpret plant drawings and manufacturers manuals

T2 Apply relevant state and territory regulations

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REQUIRED SKILLS AND KNOWLEDGE

T3 Apply enterprise recording procedures

T4 Identify plant status

T5 Prepare plant/equipment for operation

T6 Organise resources

T7 Operate fuel firing plant

T8 Apply diagnostic and testing techniques

T9 Identify and respond to abnormal plant operating conditions

T10 Plan and prioritise work

T11 Use relevant hand tools

T12 Communicate effectively

T13 Apply data analysis techniques and tools

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

9.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord

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with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as

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specified in the Performance Criteria and Range Statement
    - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
    - Demonstrate an appropriate level of employability skills
    - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
    - Knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
    - Preparation and planning of work
    - Operation of fuel firing plant
    - Operationally testing plant
    - Analysing plant faults
    - Monitoring plant operation
    - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces,

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with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment

9.4)

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines..

Note: Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the unit of competency as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Plant may include: Boilers and Gas Turbines

Plant and equipment may include: electrical supply switchboard and electric motors; gas supply system; gas ignition system; fuel oil supply system; Fuel oil ignition system; Fuel oil and gas burners, coal supply system; coal feeders; coal mills/pulverisers; primary and secondary air supplies, pulverised fuel burners, fire protection systems, mill inerting systems; valves, actuators and dampers (electric,

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RANGE STATEMENT

hydraulic, pneumatic and manual); fans, pumps and compressors, compressed air systems, pulse air systems; ignition and cooling air systems; lubrication oil systems, power oil systems, air intake systems, filters, strainers, pressure control devices; auxiliary steam systems, supervisory, protection, alarm and control equipment; burner management and fuel safety systems.

Safety standards may include relevant sections of Occupational Health and Safety legislation, enterprise safety rules, relevant state and federal legislation, national standards for plant and environmental legislation.

Information and documentation sources may include verbal or written communications; enterprise safety rules documentation; enterprise operating instructions; dedicated computer equipment; enterprise/site standing and operating instructions; enterprise log books; manufacturer operation and maintenance manuals; and equipment and alarm manuals.

Technical and operational indicators may include stimuli (audio, smell, touch, visual), local indicators and recorders, computers and alarms (visible and or audible).

Communications may be by means of telephone, two way radio, pager, public address system, computer (electronic mail) and operating log (written or verbal).

Tests may include post maintenance operating tests and stand-by plant tests.

Appropriate personnel to consult, give or receive direction may include supervisor/team leader or equivalent, technical and engineering officers or equivalent, power system control personnel or equivalent; contractor and specialist personnel, maintenance staff and power plant operations personnel.

Test, fault finding and operating tools may include gas detector, power or hand tools and control system equipment.

Operating environment may be during inclement or otherwise harsh weather conditions, in wet/noisy/dusty/hot areas, during night periods and during continuous operation.

Faults and abnormal operating conditions may include motor/pump/ actuator/valve/dampers failure/malfunctions, control equipment failure/ malfunctions, loss of electrical supply to plant and equipment, excessive vibration of pumps/motors, high filter/strainer differentials, delivery system blockages, fuel preparation and delivery system fires, pipe fracture and leaks.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

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Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations.

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UEPOPS355B Monitor the implementation of under frequency load shedding

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to implement and monitor Under Frequency Load Shedding facilities for isolated and integrated generation/network systems.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety.

Pre-Requisites

Prerequisite Unit(s) **4)**

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Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT		PERFORMANCE CRITERIA	
1	Plan for Load Shedding	1.1	Safety issues are identified to comply with enterprise/site requirements
		1.2	Work, plant and resource requirements are identified from relevant information and documentation
		1.3	Checks are carried out in accordance with enterprise and site requirements
		1.4	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2	Set Under Frequency Load Shedding	2.1	Individual Load Source data is collated, assessed, evaluated and prioritised in accordance with enterprise/site procedures.
		2.2	Data is assessed against trends to determine suitability for load shed selection.
		2.3	Load data is grouped and summed to match generator/units output into stages of priority.
		2.4	Selected load shedding is implemented.
		2.5	Staged load data is monitored and recalculated to detect deviations from parameters in accordance with enterprise procedures.
3	Respond to Under Frequency Load Shedding Operation	3.1	Load data is monitored and selections adjusted to maintain values within permissible parameters.
		3.2	Enterprise procedures relating to deviations are followed and appropriate stakeholders are consulted and course of corrective action determined.
4	Complete documentation	4.1	Documentation is updated and status are reported and logged in accordance with enterprise/site procedures

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of monitoring the implementation of under frequency load shedding.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO355B The implementation of under frequency load shedding

Evidence shall show that knowledge has been acquired for safe working practices of:

T1 Relevant environmental, occupational health and safety legislation and regulations

T2 Enterprise procedures

T3 Plant drawings and manufacturers manuals

T4 Introduction to and typical arrangements of power production plant

T5 Relevant plant and equipment, its location and operating parameters

T6 Switchgear types and characteristics

T7 Electrical protection types and characteristics

T8 Electrical fundamentals

T9 Transformers types and characteristics

T10 Relevant state and territory regulations

T11 Plant status

T12 Plant operating parameters

T13 Enterprise recording procedures

T14 Systems components and interactions, load shedding schemes, customer prioritisation, stakeholder communication and generator capacities.

KS02-PO355B The implementation of under frequency load shedding

Specific skills needed to achieve the Performance Criteria:

T1 Interpret plant drawings and manufacturers manuals

T2 Apply relevant state and territory regulations

T3 Identify plant status

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REQUIRED SKILLS AND KNOWLEDGE

T4 Prepare plant/equipment for operation

T5 Communicate effectively

T6 Co-ordinate the operation of plant and equipment;

T7 Apply data analysis techniques and tools

T8 Recognise abnormal plant operating conditions

T9 Apply or determine appropriate corrective actions required

T10 Plan and prioritise work

T11 Interpret remote indication of plant status and condition

T12 Set load shedding within operation parameters, forecast system load shifting, scheduling load shedding to match generator output.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by

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various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge

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and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
- Demonstrate an appropriate level of employability skills
- Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures

- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Plan and Prepare for equipment operation
  - Set Under Frequency Load-Shedding
  - Respond to Deviations
  - Analyse system/plant data
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

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Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.Note: Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the unit of competency as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Key indicators may include frequency, voltages, and currents, plant temperatures, power flows, power factor, generation plant load capabilities, protection settings, visual and audible indicators, analogue and digital displays and load shedding requirements.

Systems, plant and equipment may include generators, unit co-ordinated control system; generator circuit breaker/transformer; unit auxiliary switchboards; electricity market, auto loading procedures, prime mover governing system.

Safety standards may include relevant sections of Occupational Health and Safety legislation, enterprise safety rules, relevant State and federal legislation and Australian

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RANGE STATEMENT

standards.

Information and documentation sources may include verbal or written communications; enterprise operating instructions; equipment and alarm manuals; dedicated computer equipment; enterprise standing instructions and plant notes; enterprise log books; market load profile forecasts; electricity market bidding information; and manufacturer operation and maintenance manuals.

Technical and operational indicators may include stimuli (audio, smell, touch, visual), remote or local indicators and recorders, computers and alarms (visible and or audible).

Communications may be by means of telephone, facsimile, two way radio, pager, computer (electronic mail) and operating logs (written or verbal).

Appropriate personnel for consultation, to give or receive direction may include supervisor/team leader; operating staff; technical and engineering officers or equivalent; maintenance personnel; and contractor staff.

The environment may be remote from plant and equipment being operated; (operation is assisted by remote indicators of plant status and other parameters monitored); during night periods; during inclement or otherwise harsh weather conditions; and in wet/noisy/dusty areas.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations.

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UEPOPS356B Apply environmental and sustainable energy procedures

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required for the implementation of environmental procedures to demonstrate duty of care and to identify assess and control environmental risks and the impact of work related activities. It includes a commitment to the principles of sustainable energy.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the

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Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Relate environmental procedures to the specific work/site	1.1 Environmental procedures are identified and examined
	1.2 Environmental procedures are related to the specific work(s)/site(s)
2 Implement environmental procedures	2.1 Relevant environmental procedures are applied to specific work(s)/site(s)
	2.2 Environmental risks and impacts are identified
	2.3 Environmental risks and impacts are assessed
	2.4 Environmental risks and impacts are controlled and monitored throughout the work
	2.5 Environmental incidents are dealt with and emergency procedures/contingencies are applied
	2.6 Work is conducted in accordance with the principles of sustainable energy and energy conservation.
	2.7 Provision for the re-cycling or re-use of materials is undertaken where possible
	2.8 Environmental incidents are reported and recorded according to established procedures
3 Application of environmental procedures is reported and reviewed	3.1 Reporting procedures for environmental processes are monitored with respect to a specific work(s)/site(s)
	3.2 Environmental risks, potential impacts and incidents are monitored and reported according to established procedures
	3.3 Participation and contribution into reviews of environmental procedures is carried out

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence must show that knowledge has been acquired of safe working practices and environmental and sustainable energy practices.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

KS01-PO356B Environmental and sustainable energy practices

Evidence shall show an understanding of how to implement environmental procedures, to demonstrate a duty of care and to assess and control environmental and control environmental risks and the impact of work related activities, to an extent indicated by the following aspects:

T1 Environmental fundamentals:

- Environmental standards, codes, environmental legislation, supply authority regulations and/or enterprise requirements applicable to the control of environment associated with the worksite encompassing:
  - Relevant Federal legislation
  - Relevant State/Territory legislation
  - Relevant local government by-laws
  - Relevant government or quasi-government policies and regulations
  - Relevant community planning and development agreements
- [N.B. Examples include land care agreements.]
  - AS/NZS ISO 14001 Standard
- Employer and employee responsibilities,
- Methods of obtaining information on environmental issues and updates,
- Methods of identifying environmental impacts from work related activities,
- Meaning of environmental terms encompassing:
  - Identification, assessment and control of risks
  - Compliance
  - Best practice
  - Sustainable Energy
  - Renewable Energy
- Environmental operating licence for electricity generation plant,
- List the penalties for environmental breaches,
- Authorities to be notified in the event of an environmental incident.

T2 Sustainable energy principles

- Notions of sustainable energy
- Solar energy

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REQUIRED SKILLS AND KNOWLEDGE

- Wind energy
- Tidal and wave energy
- Biomass energy
- Hydro-electric energy
- Geothermal energy
- Non-renewable energy

T3 Environmentally sustainable work practice

- Notion of sustainable work practice
- Effects of neglecting sustainable work practice
- The greenhouse effect – causes, consequences
- International and national greenhouse imperatives
- The role of regulators and similar bodies
- Economic benefits of sustainable initiatives
- Techniques for reducing carbon-produced energy and hence greenhouse gases:
  - Domestic, commercial and industrial strategies
  - Trade related technologies and methods
  - Energy efficient retrofits (overview)
  - Renewable energy technologies (overview)

T4 Pollution control

- Air pollution
- Water pollution
- Soil pollution
- Noise pollution
- Greenhouse gases
  - CO2
  - Methane
  - NOx
  - Sulphur Hexafluoride (SF6)
- Oxides of sulphur
- Environmentally hazardous chemicals used around electricity generating plants.
- Technology used to reduce gas emissions
- Cooling towers
  - Controlling Legionnaire’s disease (Legionellosis bacterium)

T5 Waste management

- Types of waste associated with electricity generation plants:
  - Fly Ash
  - Sludge and slurry
  - Oil

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REQUIRED SKILLS AND KNOWLEDGE

- Dust
- Heat
- Steam
- EMF radiation
- Asbestos
- Sulphur Hexafluoride (SF6)
- Halon fire suppressant gas
- CFC refrigerant gases

- Classification of wastes
- Waste management standards
- Waste disposal methods.

T6 Environmental Management Systems (EMS)

- Principles of environmental management systems
- Models of environmental management systems (including specific enterprise models)
- Enterprise documentation and record keeping associated with EMS

T7 Vegetation management

- Protected and threatened species of flora
- Heritage listed vegetation
- Noxious weeds
- Pesticides and herbicides
- Bushfire management
- Erosion control

T8 Heritage protection

- Built environment
- Indigenous sites
- Culturally and historically significant sites
- Environmentally sensitive sites

T9 Recycling and re-use

- Uses of fly ash by-product

T10 Water management

- Dams and catchments
- Floodplains and wetlands
- Drainage sites
- Ponds

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Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

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Critical aspects of evidence required to demonstrate competency in this unit **9.2)**

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Knowledge and application of relevant sections of; Environmental Legislative requirements; Environmental Statutory legislation; Enterprise/site Environmental and Sustainable energy principles and practice
  - Apply environmental risk assessment process
  - Implement, monitor and review environmental procedures during the currency of the work
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

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Context of and specific resources for assessment **9.3)**

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note: Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

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There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the unit of competency as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

All work is performed in accordance with relevant enterprise safe working practices/established procedures and environmental requirements, manufacturer's specifications, codes of practice, statutory requirements, Australian Standards and Occupational Health and Safety standards.

Specific work(s)/site(s) may include, but is not limited to buildings; plants construction and maintenance sites; workshops; laboratories; dams; catchments; flood plains irrigation sites; wetlands; drainage sites; waste disposal sites

Environmental risks may include impact of mismanagement of chemicals; impact of mismanagement of biological agents; detrimental impact on limited water resources; spillage; waste disposal; detrimental impact on water catchment areas (urban and non-urban); detrimental impact on rivers, waterways and channels; unsatisfactory trade waste treatment and disposal processes; poor construction processes; planning deficiencies; neglect of sustainable energy principles

Environmental legislation may include relevant federal legislation; relevant State/Territory legislation; relevant local government by-laws; relevant government or quasi government policies and regulations; relevant community planning and development agreements (e.g. land care agreements)

Incidents of environmental impact may include emissions to air; releases to/of water; releases to land; vibration and noise; disposal of waste; contamination of land; impact on communities; reduction of biodiversity; destruction of habitat; use of energy sources; waste generation processes and technologies; impact on culturally significant sites; and may involve the implementation of emergency responses

Environmental management documentation may include information on applicable environmental laws or other requirements; complaint records; training records; process information; process operational log books; inspection, maintenance and calibration records; relevant contractor and supplier information; incident reports; information on emergency preparedness and response; records of significant environmental impacts and compliance records.

Generic terms are used throughout this Training Package for vocational standard shall

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RANGE STATEMENT

be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations.

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UEPOPS357B Operate Local L.V. Switchgear

Modification History

Release	Action	Core/Elective	Details	Points
2	Edit		Remove word ‘high’ in Unit Descriptor.	

Unit Descriptor

Unit Descriptor

1) Scope:

1.1) Descriptor

This unit deals with the skills and knowledge required to undertake the local operation of low voltage secondary circuit breaking devices.

Application of the Unit

Application of the Unit

2)

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice

3)

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the

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Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare to operate low voltage secondary switchgear	1.1 Work requirements are identified and clarified/confirmed with appropriate parties in accordance with enterprise procedures
	1.2 Procedures/safety precautions when operating L.V. switch gears are identified and recognised in accordance with enterprise procedures
	1.3 Location of switchgear is determined from appropriate drawings, plans and maps
	1.4 Identify switch gear type and determine correct operating procedure in accordance with enterprise procedures
	1.5 Examine and assess switch gear condition for safe operation in accordance with enterprise procedures
	1.6 Suppress related protection if and where necessary in accordance with enterprise procedures
	1.7 Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2 Operate switch gear	2.1 Mechanical operation and limitations of the equipment are identified in accordance with enterprise procedures
	2.2 Implications of actions are identified and recognised in accordance with enterprise procedures
	2.3 Switch gear is operated and confirmation that required status has been achieved is given in accordance with enterprise procedures

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ELEMENT		PERFORMANCE CRITERIA	
		2.4	Racking, testing, isolation, circuit earthing and reinstatement procedures are carried out to manufacturer instructions and enterprise/site procedures
		2.5	Confirm test equipment's integrity and prove circuit de-energised in accordance with operating procedures
3	Validate switch gear integrity	3.1	Equipment inspected for safe operation in accordance with enterprise procedures
		3.2	Switch gear environment is inspected to ensure all statutory requirements are met
		3.3	Confirm switch gear operates in accordance with manufacturer specifications
4	Complete documentation	4.1	Documentation is updated, log sheets maintained and plant problems, movements, abnormalities and status are reported and logged in accordance with enterprise/site procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of operating L.V switchgear.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO357B Local L.V. Switchgear

Evidence shall show that knowledge has been acquired for safe working practices of:

T1 Relevant environmental, occupational health and safety legislation and regulations

T2 Enterprise procedures

T3 Plant drawings and manufacturers manuals

T4 Introduction to and typical arrangements of power production plant

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REQUIRED SKILLS AND KNOWLEDGE

T5 Relevant plant and equipment, its location and operating parameters

T6 Electric motor types and characteristics

T7 Switchgear types and characteristics

T8 Electrical protection types and characteristics

T9 Electrical fundamentals

T10 Relevant state and territory regulations

T11 Electrical protection equipment, types and characteristics

T12 H.V electrical operation procedure and practices

T13 Personal protective equipment requirements for L.V. switch gear operation

T14 Secondary switch gear operating parameters

T15 Enterprise recording procedures

T16 Consequences of operator actions

T17 H.V. power systems and parameters

T18 H.V. protection schemes

T19 Enterprise procedures

T20 Secondary switch gear construction and operation

T21 Isolation and earthing procedures

KS02-PO357B Local L.V. Switchgear

Specific skills needed to achieve the Performance Criteria:

T1 Interpret plant drawings and manufacturers manuals

T2 Apply relevant state and territory regulations

T3 Apply enterprise recording procedures

T4 Locate relevant plant and equipment

T5 Operate switch gear within design parameters

T6 Identify plant status

T7 Prepare equipment for operation

T8 Communicate effectively

T9 Recognise abnormal switch gear operation

T10 Plan and prioritise work

T11 Use plans, diagrams and symbols

T12 Operate protection equipment

T13 Isolate and earth equipment

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Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and

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developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - The preparation for secondary switchgear operations
  - The operation and knowledge of secondary switch gear
  - The implications of secondary switch gear operations

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- Apply environmental risk assessment process
- Implement, monitor and review environmental procedures during the currency of the work
- Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment **9.3)**

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.Note: Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills

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described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the unit of competency as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Equipment may include Links (single and three phase), RMU (vacuum, oil, gas, air), Fuses (EDO, HRC,) Switches (vacuum, oil, gas, air), Isolators (Air gas vacuum oil), Circuit recloser (oil, gas), earthing and discharge equipment, gloves, testers, computers with equipment control functions; protection settings, alarm and control equipment. (Personal safety equipment). Any LV that directly impacts on HV switching (e.g. LV backfeeds).

Safety standards may include relevant sections of occupational health and safety legislation, enterprise safety rules, relevant state and federal legislation and national standards for plant

Information and documentation sources may include verbal or written communications; single line drawing and schematics, enterprise safety rules documentation; enterprise operating instructions; dedicated computer equipment; enterprise/site standing and operating instructions; enterprise log books; manufacturer operation and maintenance manuals; and equipment and alarm manuals

Technical and operational indicators may include stimuli (audio, smell, touch, visual), local indicators and recorders, computers and alarms (visible and or audible)

Communications may be by means of telephone, two way radio, pager, computer (electronic mail), operating logs (written or verbal) and intercom

Appropriate personnel for consultation, to give or receive direction may include supervisor/team leader or equivalent, power plant operations personnel or equivalent, technical and engineering officers or equivalent, maintenance staff, other operating

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RANGE STATEMENT

staff or equivalent, system controller/network controller and field operator and restricted H.V. operators

Implications may be safety of personnel and public, damage to equipment, loss of plant, legal implications, system integrity, capital cost, lost enterprise revenue and community costs.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations.

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UEPOPS358A Monitor and Maintain Wind Farm Civil Assets

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to condition monitor and conduct preventative, remedial maintenance required to ensure the integrity of civil assets associated within a wind farm.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships.

Pre-Requisites

Prerequisite Unit(s) **4)**

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Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no prerequisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT		PERFORMANCE CRITERIA	
1	Plan and prepare for the work	1.1	Occupational Health and Safety standards, statutory requirements, relevant Australian standards, codes of practice, manufacturer specifications, environmental requirements and enterprise procedures are identified, applied and monitored throughout the work procedure.
		1.2	Work requirements are identified from request/works orders or equivalent and clarified/confirmed with appropriate parties or by site inspection.
		1.3	Resources required to satisfy the work are identified, obtained and inspected for compliance in accordance with enterprise procedures.
		1.4	Potential hazards are identified and prevention and/or control measures are selected in accordance with the work plan and site procedures.
		1.5	Work is planned in detail including sequencing and prioritising and considerations made, where appropriate, for maintenance of plant security and capacity in accordance with site requirements.
		1.6	Co-ordination requirements, including requests for isolations where appropriate, are resolved with others involved, affected or required by the work.
2	Monitor civil assets	2.1	Inspections of assets are completed in accordance with enterprise/site requirements.
		2.2	Inspections are reported in accordance with enterprise/site requirements.
		2.3	Defects are repaired or reported in accordance with enterprise/site requirements.
3	Maintain civil assets	3.1	Maintenance of civil assets is undertaken in accordance with site requirements and local

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ELEMENT	PERFORMANCE CRITERIA	
		conditions.
	3.2	Appropriate tools, equipment or plant required to maintain assets is utilised in accordance with manufacturer's specifications and job requirements.
	3.3	Defects are repaired or reported in accordance with enterprise/site requirements.
4 Complete the work	4.1	Work is completed and appropriate personnel notified in accordance with enterprise/site requirements.
	4.2	Work area is cleared of waste, cleaned, restored and secured in accordance with enterprise/site requirements.
	4.3	Tools and equipment are maintained in accordance with manufacturer specifications and enterprise/site procedures.
	4.4	Work completion details are finalised in accordance with enterprise/site procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of monitor and maintain wind farm civil assets. The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO358A Wind Farm Civil Assets

Evidence shall show that knowledge has been acquired for safe working practices of:

T1 Relevant Environmental, Occupational Health and Safety legislation and regulations

T2 Enterprise procedures

T3 Plant drawings and manufacturers manuals

T4 Introduction to and typical arrangements of wind farm power plant

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REQUIRED SKILLS AND KNOWLEDGE

T5 Wind farm principles

T6 Wind turbine types and characteristics

T7 General layout of work site and associated assets

T8 Relevant monitoring and maintenance procedures and techniques

T9 Lifting equipment and techniques, surface preparation and treatment techniques

T10 Communication equipment and operating procedures.

KS02-PO358A Wind Farm Civil Assets

Specific skills needed to achieve the Performance Criteria:

T1 Interpret plant drawings and manufacturers manuals

T2 Apply monitoring and maintenance procedures

T3 Identify and select equipment and materials for the job

T4 Use hand and portable power tools

T5 Use relevant lifting and load shifting equipment

T6 Perform equipment user maintenance

T7 Store and maintain tools and equipment

T8 Communicate effectively.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment	**9.1)**
	Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment

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intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much (and in what detail) the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all prerequisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline,

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work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:

- Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
- Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
- Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
- employability skillsConduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures

- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Preparation of planning of work
  - Monitoring of civil assets.
  - Maintenance of civil assets.
  - Completion of work procedures
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

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Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment

9.4)

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note: Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the unit of competency as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Civil assets may include: buildings, roads, fences, wind monitoring tower, lighting

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RANGE STATEMENT

towers, transmission line structures, walkways and poles.

Maintain civil assets may include: repairs to buildings, maintenance of buildings, maintenance of roads, repairs to fences, repairs to towers, weed control, inspection of poles, maintenance of tourist locations and repairs to walkways.

Safety standards may include relevant sections of Occupational Health and Safety legislation, enterprise safety rules, relevant state and federal legislation, local by-laws, environmental requirements, relevant licensing requirements for tools and mobile plant.

Communications may be by means of telephone, fax, two-way radio, dedicated computer equipment, logs, and verbal.

Appropriate personnel to consult, give or receive direction may include power plant operator/system controllers, technical and engineering officers, maintenance staff, other authorities, contractors and general public.

Tools and equipment may include lifting equipment, cranes, hoists, mobile plant, four wheel drive vehicles, earth moving equipment, trash rakes, power tools, chainsaws, boats, hand tools and fire suppression equipment.

Extreme and varied weather conditions may be encountered, including rain, high winds and flooding.

Work completion details may include enterprise recording procedures (electronic or hard copy).

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations.

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UEPOPS359A Monitor Climatic Conditions for Renewable Energy Production

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to monitor weather and climate conditions. It also includes taking suitable preventative actions to ensure the safety of personnel, plant and equipment in adverse weather conditions.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no prerequisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the

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Evidence Guide.

Elements and Performance Criteria

ELEMENT		PERFORMANCE CRITERIA	
1	Interpret weather and climate information	1.1	Weather and climate information and warnings are regularly monitored to determine likely conditions.
		1.2	Potential variations in weather and climate conditions are anticipated and assessed according to warnings, weather patterns and historical experience.
		1.3	Possible impacts of weather and climate on plant, equipment and civil assets are identified.
		1.4	Stakeholders and key personnel are informed of the anticipated impacts of weather and climate on plant, equipment and civil assets.
2	Carry out preventative actions	2.1	Appropriate preventative actions are identified in accordance with enterprise and manufacturers procedures and recommendations.
		2.2	Stakeholders and key personnel are informed and involved in the development of preventative actions.
		2.3	Suitable preventative actions are reviewed to ensure availability of appropriate resources, safety of personnel, plant and equipment.
		2.4	Actions to minimise loss and damage of plant, equipment and civil assets are implemented in accordance with enterprise and manufacturers procedures and recommendations.
		2.5	Actions to ensure the safety of personnel are implemented in accordance with enterprise procedures.
3	Monitor weather and climate during adverse conditions	3.1	Weather and climate information and warnings are regularly monitored to determine ongoing suitability of current preventative actions.

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ELEMENT		PERFORMANCE CRITERIA	
		3.2	Preventative actions are adjusted and revised according to weather and climatic changes.
4	Return to normal operations	4.1	Weather and climate information and warnings are regularly monitored to determine the normal conditions have returned.
		4.2	Plant, equipment and civil assets are inspected for damage in accordance with enterprise and manufacturers procedures and recommendations
		4.3	Plant, equipment and civil assets are placed back into service in accordance with enterprise and manufacturers procedures and recommendations.
		4.4	Effectiveness of preventative actions is reviewed and recommendations are developed to improve the process.
5	Complete documentation	5.1	Documentation is updated in accordance with enterprise/site procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of operating and monitor climatic conditions for renewable energy production

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO359A Climatic Conditions for Renewable Energy Production

Evidence shall show that knowledge has been acquired for safe working practices of:

T1 Relevant Environmental, Occupational Health and Safety legislation and regulations

T2 Enterprise procedures

T3 Plant drawings and manufacturers manuals

T4 Introduction to and typical arrangements of power production plant

T5 Relevant plant and equipment, its location and operating parameters

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REQUIRED SKILLS AND KNOWLEDGE

T6 Relevant state and territory regulations

T7 Plant status

T8 Effects of wind and rain on plant, equipment and civil assets

T9 Weather and climate conditions and its impact on plant, equipment and civil assets

T10 Knowledge of climate and weather patterns in local area.

KS02-PO359A Climatic Conditions for Renewable Energy Production

Specific skills needed to achieve the Performance Criteria:

T1 Interpret plant drawings and manufacturers manuals

T2 Interpret weather and climate conditions and its impact on plant, equipment and civil assets

T3 Apply relevant state and territory regulations

T4 Apply enterprise recording procedures

T5 Identify plant status

T6 Prepare plant/equipment for operation

T7 Organise resources

T8 Plan and prioritise work

T9 Use relevant hand tools

T10 Communicate effectively

T11 Apply data analysis techniques and tools.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

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Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all prerequisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with

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the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - employability skillsConduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Interpret weather and climate information
  - Carry out preventative action
  - Monitor weather and climate during adverse conditions
  - Return to normal operations Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

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Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

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Range Statement

RANGE STATEMENT

10) This relates to the unit of competency as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Plant and equipment may include: wind turbines, solar dishes, solar panels, transformers, electrical supply switchboards and overhead electrical lines.

Civil assets may include: roads, fences, buildings and walkways.

Weather and climate information may be sourced from: Radio, T.V., Internet, email, fax, telephone, newspapers, word of mouth and enterprise weather stations.

Weather and climate conditions may include: fire, flood, wind, rain, hail, storm, cyclones, heat waves, snow, dust, frost, gale and rapid changes in temperature or weather conditions.

Preventative actions may include: placing plant and equipment in safe mode, lowering wind turbine towers, changing load on equipment, change electrical load, securing equipment and buildings, preparing fire breaks, assuring water supply, rescheduling work tasks and moving personnel to safe locations.

Safety standards may include relevant sections of Occupational Health and Safety legislation, enterprise safety rules, relevant state and federal legislation and environmental legislation

Information and documentation sources may include verbal or written communications; enterprise safety rules documentation; enterprise operating instructions; dedicated computer equipment; enterprise/site standing and operating instructions; enterprise log books; manufacturer operation and maintenance manuals; and equipment and alarm manuals.

Communications may be by means of telephone, two way radio, pager, computer (electronic mail), operating log (written or verbal) and public address system.

Appropriate personnel to consult, give or receive direction may include supervisor/team leader or equivalent, technical and engineering officers or equivalent, power system control personnel or equivalent; contractor and specialist personnel, maintenance staff and power plant operations personnel.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

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Competency Field

Competency Field **11)**

Operations.

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UEPOPS360A Operate and Monitor a Hydro Turbine

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to operate, inspect and monitor of an in-service hydro turbine

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety.

Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

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Prerequisite Unit(s) **4)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no prerequisite

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Plan and prepare work	1.1	Safety issues are identified to comply with enterprise/site requirements
	1.2	Work, plant and type of start requirements are identified from relevant personnel and documentation
	1.3	The turbine running-up and loading schedule are ascertained from relevant documentation and in accordance with enterprise/site requirements
	1.4	Localised plant inspection, pre operational tests and field preparation for service are carried out in accordance with manufacturer and enterprise/site procedures
	1.5	Plant operational prerequisites are established in accordance with manufacturer and enterprise/site procedures
	1.6	Sequence for recommissioning of plant is determined to suit existing circumstances in accordance with enterprise/site requirements
2 Operate hydro turbine	2.1	Output is adjusted to achieve required hydro turbine operating conditions and demand, observing operational requirements
	2.2	Plant is operated within limits of plant design, enterprise or site requirements
	2.3	Plant is monitored and observed to detect deviations from required operating conditions
	2.4	Corrective actions are taken to rectify abnormalities in accordance with manufacturer and enterprise/site procedures
3 Test plant operation	3.1	Tests are performed in accordance with defined procedures applicable to the operational test
	3.2	System and plant is observed for correct operational response
	3.3	Correct action is taken when response is not in accordance with documentation, plant integrity

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ELEMENT		PERFORMANCE CRITERIA	
			or personnel safety requirements
		3.4	Plant is returned to required safe operational status upon completion of test
4	Analyse plant faults	4.1	Cause of abnormal plant operating conditions are identified by analysing the technical and operational information in a logical and sequential manner
		4.2	Actions necessary to rectify fault are correctly determined
		4.3	Plant integrity and personnel safety is maintained through consultation with appropriate personnel, and reference to plant, technical and operational documentation
5	Monitor and inspect plant	5.1	Plant to be monitored/inspected is physically identified
		5.2	Plant is monitored/inspected for normal operation or to detect deviations
		5.3	Corrective action taken is in accordance with enterprise procedures
		5.4	Appropriate personnel are notified when defects are detected
6	Complete documentation	6.1	Documentation is updated and plant problems, movements, abnormalities and status are reported and logged in accordance with enterprise/site procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of operating a hydro turbine.

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REQUIRED SKILLS AND KNOWLEDGE

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO360A A Hydro Turbine

Evidence shall show that knowledge has been acquired for safe working practices of:

T1 Relevant Environmental, Occupational Health and Safety legislation and regulations

T2 Enterprise procedures

T3 Plant drawings and manufacturers manuals

T4 Introduction to and typical arrangements of hydro power production plant

T5 Relevant plant and equipment, its location and operating parameters

T6 Electric motor types and characteristics

T7 Pump and compressor types and characteristics

T8 Valve, and actuator types and characteristics

T9 Switchgear types and characteristics

T10 Electrical protection types and characteristics

T11 Relevant state and territory regulations

T12 Plant status

T13 Control and data acquisition systems

T14 Condition monitoring trending equipment

T15 Hydro turbine, types and characteristics

T16 Hydro turbine governor, types and characteristics

T17 Headgate, tailgate, intake, penstock, tunnels and tail races, types and characteristics

T18 hydro generator types and characteristics

T19 Generator performance characteristics

T20 Speed control systems

T21 Electrical fundamentals

T22 Electrical supply and distribution systems

T23 Cooling water systems and filtration

T24 heat exchanger types and characteristics lubrication systems and oil conditioning systems

T25 Equipment behaviours under the influence of high water pressure and/or flows

KS02-PO360A A Hydro Turbine

Specific skills needed to achieve the Performance Criteria:

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REQUIRED SKILLS AND KNOWLEDGE

T1 Interpret plant drawings and manufacturers manuals

T2 Apply relevant state and territory regulations

T3 Apply enterprise recording procedures

T4 Identify plant status

T5 Prepare plant/equipment for operation

T6 Organise resources

T7 Apply diagnostic and testing techniques

T8 Identify and respond to abnormal plant operating conditions

T9 Plan and prioritise work

T10 Use relevant hand tools

T11 Communicate effectively

T12 Access and Apply data analysis techniques and tools to hydro machine conditiomonitoring data/trends

T13 Operate equipment under the influence of high water pressures and or flows

T14 Co-ordinate the remote operation of equipment to maintain personnel safety and plant integrity

T15 Operate a hydro turbine generator/pump unit.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment	**9.1)**
	Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment

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intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all prerequisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline,

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work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:

- Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
- Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
- Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
- employability skillsConduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures

- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Preparation and planning of work
  - Operation of hydro turbine unit
  - Operationally testing plant
  - Analysing plant faults
  - Monitoring plant operation
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace

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conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment

9.4)

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.Note: Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the unit of competency as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

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RANGE STATEMENT

Plant and equipment may include turbines; including Kaplan, Pelton and Francis type turbines; and equipment; governor and associated hydraulic circuits; auxiliary plant; computer with equipment control functions; supervisory, alarm and control equipment; electrical motors, fans and pumps; electrical supply and distribution systems; valves and dampers (electric, hydraulic, pneumatic and manual); lubrication and oil conditioning systems; fire protection equipment; heat exchangers, filters and strainers; transformers; water drainage systems; and environmental protective systems.

Safety standards may include relevant sections of Occupational Health and Safety legislation, enterprise safety rules, relevant state and federal legislation, national standards for plant Australian standards and enterprise safety procedures and practices

Information and documentation sources may include verbal or written communications; enterprise safety rules documentation; enterprise operating instructions; dedicated computer equipment; enterprise/site standing and operating instructions; enterprise log books; manufacturer operation and maintenance manuals; and equipment and alarm manuals.

Technical and operational indicators may include stimuli (audio, smell, touch, visual), remote or local indicators and recorders, computers and alarms (visible and or audible).

Tests may include motor direction checks, stand-by plant “cut-in” tests, relief valves operation tests, overspeed tests and main inlet valves/guide vanes timing tests.

Communications may be by means of telephone, two way radio, pager, computer (electronic mail) and operating logs (written or verbal).

Appropriate personnel to consult, give or receive direction may include, supervisor/team leader or equivalent, engineering officer / hydro maintenance office or equivalent, technical and engineering officers or equivalent, contractor staff, maintenance staff, applicable water control authority or equivalent and “transgrid” operator or equivalent.

Test, fault finding and operating tools may include low and high voltage testers, proving dead equipment, powered or non-powered hand tools.

Operating environment may be remote from plant, aided by indicators and monitors, during inclement or otherwise harsh weather conditions, in wet/noisy/dusty/hot areas, during night periods or locally aided by visual and audible indicators.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

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Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations.

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UEPOPS361A Operate and Monitor Hydro Plant Auxiliary Systems

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to operate, inspect and monitor of hydro plant auxiliary systems

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety.

Pre-Requisites

Prerequisite Unit(s) **4)**

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Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no prerequisite units

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Plan and prepare work	1.1	Safety issues are identified to comply with enterprise/site requirements
	1.2	Work, plant and type of start requirements are identified from relevant personnel and documentation
	1.3	The turbine running-up and loading schedule are ascertained from relevant documentation and in accordance with enterprise/site requirements
	1.4	Localised plant inspection, pre operational tests and field preparation for service are carried out in accordance with manufacturer and enterprise/site procedures
	1.5	Plant operational prerequisites are established in accordance with manufacturer and enterprise/site procedures
	1.6	Sequence for recommissioning of plant is determined to suit existing circumstances in accordance with enterprise/site requirements
2 Operate plant	2.1	Plant is operated in accordance with enterprise and manufacturer operating procedures
	2.2	Plant is monitored and observed to detect deviations from normal operating conditions
	2.3	Corrective actions are taken to rectify abnormalities in accordance with manufacturer and enterprise/site procedures
3 Test plant operation	3.1	Tests are performed in accordance with defined procedures applicable to the operational test
	3.2	System and plant is observed for correct operational response
	3.3	Correct action is taken when response is not in accordance with documentation, plant integrity or personnel safety requirements

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ELEMENT		PERFORMANCE CRITERIA	
		3.4	Plant is returned to required operational status upon completion of test
4	Analyse plant faults	4.1	Cause of abnormal plant operating conditions are identified by analysing the technical and operational information in a logical and sequential manner
		4.2	Actions necessary to rectify fault are correctly determined
		4.3	Plant integrity and personnel safety is maintained through consultation with appropriate personnel, and reference to plant, technical and operational documentation
5	Monitor and inspect plant	5.1	Plant to be monitored/inspected is physically identified
		5.2	Plant is monitored/inspected for normal operation or to detect deviations
		5.3	Corrective action taken is in accordance with enterprise procedures
		5.4	Appropriate personnel are notified when defects are detected
6	Complete documentation	6.1	Documentation is updated and plant problems, movements, abnormalities and status are reported and logged in accordance with enterprise/site procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired in operating hydro plant auxiliary systems.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO361A Hydro Plant Auxiliary Systems

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REQUIRED SKILLS AND KNOWLEDGE

Evidence shall show that knowledge has been acquired for safe working practices of:

T1 Relevant Environmental, Occupational Health and Safety legislation and regulations

T2 Enterprise procedures

T3 Plant drawings and manufacturers manuals

T4 Introduction to and typical arrangements of hydro power production plant

T5 Relevant plant and equipment, its location and operating parameters

T6 Dewatering systems types and characteristics

T7 Electric motor types and characteristics

T8 Cooling water systems types and characteristics

T9 Pump and compressor types and characteristics

T10 Valve, damper and actuator types and characteristics

T11 Switchgear types and characteristics

T12 Electrical protection types and characteristics

T13 Relevant state and territory regulations

T14 Plant status

T15 Control and data acquisition systems

T16 Hydro turbine, types and characteristics

T17 Hydro turbine governor, types and characteristics

T18 Headgate, tailgate, intake, penstock, tunnels and tail races, types and characteristics

T19 hydro generator types and characteristics

T20 Speed control systems

T21 Electrical fundamentals

T22 Electrical supply and distribution systems

T23 heat exchanger types and characteristics

T24 lubrication systems and oil conditioning systems

T25 Equipment behaviours under the influence of high water pressure and/or flows

KS02-PO361A Hydro Plant Auxiliary Systems

Specific skills needed to achieve the Performance Criteria:

T1 Interpret plant drawings and manufacturers manuals

T2 Apply relevant state and territory regulations

T3 Apply enterprise recording procedures

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REQUIRED SKILLS AND KNOWLEDGE

T4 Identify plant status

T5 Prepare plant/equipment for operation

T6 Organise resources

T7 Apply diagnostic and testing techniques

T8 Identify and respond to abnormal plant operating conditions

T9 Plan and prioritise work

T10 Use relevant hand tools

T11 Communicate effectively

T12 Apply data analysis techniques and tools

T13 Operate equipment under the influence of high water pressures and or flows

T14 Co-ordinate the remote operation of equipment to maintain personnel safety and plant integrity

T15 Operate a hydro turbine generator/pump unit.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment	**9.1)**
	Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is

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recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all prerequisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and

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Range Statement

- Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
- Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
- employability skillsConduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures

- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Preparation and planning of work
  - Operation of hydro plant auxiliary systems
  - Operationally testing plant
  - Analysing plant faults
  - Monitoring plant operation
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

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In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment

9.4)

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note: Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the unit of competency as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Plant and equipment may include oil injection systems; brakes and jacks; cooling water systems, lubrication systems, dewatering systems; computer with equipment control functions; supervisory, alarm and control equipment; electrical motors, fans and pumps; electrical supply and distribution systems; valves and dampers (electric,

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RANGE STATEMENT

hydraulic, pneumatic and manual); lubrication and oil conditioning systems; fire protection equipment; heat exchangers, filters and strainers; transformers; water drainage systems; and environmental protective systems.

Safety standards may include relevant sections of Occupational Health and Safety legislation, enterprise safety rules, relevant state and federal legislation, national standards for plant and Australian standards.

Information and documentation sources may include verbal or written communications; enterprise safety rules documentation; enterprise operating instructions; dedicated computer equipment; enterprise/site standing and operating instructions; enterprise log books; manufacturer operation and maintenance manuals; and equipment and alarm manuals.

Technical and operational indicators may include stimuli (audio, smell, touch, visual), remote or local indicators and recorders, computers and alarms (visible and or audible).

Tests may include motor direction checks, stand-by plant “cut-in” tests, relief valves operation tests and overspeed tests.

Communications may be by means of telephone, two way radio, pager, computer (electronic mail) and operating logs (written or verbal).

Appropriate personnel to consult, give or receive direction may include, supervisor/team leader or equivalent, engineering officer / hydro maintenance office or equivalent, technical and engineering officers or equivalent, contractor staff, maintenance staff, applicable water control authority or equivalent and “transgrid” operator or equivalent.

Test, fault finding and operating tools may include low and high voltage testers, proving dead equipment, powered or non-powered hand tools.

Operating environment may be remote from plant, aided by indicators and monitors, during inclement or otherwise harsh weather conditions, in wet/noisy/dusty/hot areas, during night periods or locally aided by visual and audible indicators.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

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Competency Field

Competency Field **11)**

Operations.

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UEPOPS362A Operate and Monitor Generator/Alternator

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to operate, inspect and monitor a Generator/Alternator

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety.

Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

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Prerequisite Unit(s) **4)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no prerequisite units

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and prepare work	1.1 Safety issues are identified to comply with enterprise/site requirements
	1.2 Work, plant and type of start requirements are identified from relevant personnel and documentation
	1.3 The turbine running-up and loading schedule are ascertained from relevant documentation and in accordance with enterprise/site requirements
	1.4 Localised plant inspection, pre operational tests and field preparation for service are carried out in accordance with manufacturer and enterprise/site procedures
	1.5 Plant operational prerequisites are established in accordance with manufacturer and enterprise/site procedures
	1.6 Sequence for recommissioning of plant is determined to suit existing circumstances in accordance with enterprise/site requirements
2 Operate plant	2.1 Output is adjusted to achieve required generator/alternator operating requirements and demand, observing operational requirements
	2.2 Plant is operated within limits of plant design, regulators requirements, enterprise or site requirements
	2.3 Plant is monitored and observed to detect deviations from required operating conditions
	2.4 Corrective actions are taken to rectify abnormalities in accordance with manufacturer and enterprise/site procedures
3 Test plant operation	3.1 Tests are performed in accordance with defined procedures applicable to the operational test
	3.2 System and plant is observed for correct operational response

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ELEMENT		PERFORMANCE CRITERIA	
		3.3	Correct action is taken when response is not in accordance with documentation, plant integrity or personnel safety requirements
		3.4	Plant is returned to required operational status upon completion of test
4	Analyse plant faults	4.1	Cause of abnormal plant operating conditions are identified by analysing the technical and operational information in a logical and sequential manner
		4.2	Actions necessary to rectify fault are correctly determined
		4.3	Plant integrity and personnel safety is maintained through consultation with appropriate personnel, and reference to plant, technical and operational documentation
5	Monitor and inspect plant	5.1	Plant to be monitored/inspected is physically identified
		5.2	Plant is monitored/inspected for normal operation or to detect deviations
		5.3	Corrective action taken is in accordance with enterprise procedures
		5.4	Appropriate personnel are notified when defects are detected
6	Complete documentation	6.1	Documentation is updated and plant problems, movements, abnormalities and status are reported and logged in accordance with enterprise/site procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of operating a

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REQUIRED SKILLS AND KNOWLEDGE

generator/alternator.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO362A Generator/Alternator

Evidence shall show that knowledge has been acquired for safe working practices of:

T1 Safety legislation and regulations

T2 Enterprise procedures

T3 Plant drawings and manufacturers manuals

T4 Introduction to and typical arrangements of power production plant

T5 Relevant plant and equipment, its location and operating parameters

T6 Electric motor types and characteristics

T7 Generator/alternator excitation systems types and characteristics

T8 Generator/alternator cooling systems types and characteristics

T9 Automatic voltage regulators types and characteristics

T10 Pump and compressor types and characteristics

T11 Switchgear types and characteristics

T12 Electrical protection types and characteristics

T13 Control and data acquisition systems

T14 Generator/alternator types and characteristics

T15 Generator performance characteristics

T16 Electrical fundamentals

T17 Generator/alternator theory of operation

T18 Heat exchanger types and characteristics

T19 lubrication systems and oil conditioning systems types and characteristics

KS02-PO362A Generator/Alternator

Specific skills needed to achieve the Performance Criteria:

T1 Interpret plant drawings and manufacturers manuals

T2 Apply relevant state and territory regulations

T3 Apply enterprise recording procedures

T4 Identify plant status

T5 Prepare plant/equipment for operation

T6 Organise resources

T7 Apply diagnostic and testing techniques

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REQUIRED SKILLS AND KNOWLEDGE

T8 Identify and respond to abnormal plant operating conditions

T9 Plan and prioritise work

T10 Use relevant hand tools

T11 Communicate effectively

T12 Apply data analysis techniques and tools

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical

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equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all prerequisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - employability skillsConduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of

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contexts from the prescribed items below:

- Knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
- Preparation and planning of work
- Operation of generator/alternator unit
- Operationally testing plant
- Analysing plant faults
- Monitoring plant operation
- Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment **9.3)**

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00

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Assessment Guidelines..

Note: Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the unit of competency as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Generator/alternator plant and equipment may include cooling water systems; lubrication systems; excitation systems; automatic voltage regulators, control system; supervisory, alarm and control equipment; electrical motors, fans and pumps; electrical supply and distribution systems; fire protection equipment; heat exchangers, filters and strainers; transformers; water drainage systems; and environmental protective systems.

Prime movers may include steam turbine; gas turbine; hydro turbine; wind turbine and reciprocating engine.

Safety standards may include relevant sections of Occupational Health and Safety legislation, enterprise safety rules, relevant state and federal legislation, national standards for plant and Australian standards and enterprise safety procedures and practices.

Information and documentation sources may include verbal or written communications; enterprise safety rules documentation; enterprise operating

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RANGE STATEMENT

instructions; dedicated computer equipment; enterprise/site standing and operating instructions; enterprise log books; manufacturer operation and maintenance manuals; and equipment and alarm manuals.

Technical and operational indicators may include stimuli (audio, smell, touch, visual), remote or local indicators and recorders, computers and alarms (visible and or audible).Tests may include HV relay tests, Control system operation tests, Rotor earth tests, Oil quality test and Cooling system tests

Communications may be by means of telephone, two way radio, pager, computer (electronic mail) and operating logs (written or verbal).

Appropriate personnel to consult, give or receive direction may include, supervisor/team leader , Network regulator, engineering officer, maintenance office or equivalent, technical and officers, contractor staff, maintenance staff,

Test, fault finding and operating tools may include low and high voltage testers, proving dead equipment, powered or non-powered hand tools.

Operating environment may be remote from plant, aided by indicators and monitors, during inclement or otherwise harsh weather conditions, in wet/noisy/dusty/hot areas, during night periods or locally aided by visual and audible indicators.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations.

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UEPOPS364A Ensure Compliance with Occupational Health and Safety policy and procedures

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to ensure defined Occupational Health and Safety policies and procedures related to the work are followed in order to ensure the individual's own safety and that of others in the workplace.

Application of the Unit

Application of the Unit **2)**

This unit describes generic Occupational Health and Safety competencies applicable for employees with minimal supervisory responsibilities

This unit may be included in a work entry program such as Safety Induction training required to gain access to a workplace.

It involves application of relevant Occupational Health and Safety legislation and codes of practice, including duties and responsibilities of all parties under the general duty of care.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However,

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License to practice **3)**

employment in the Electricity Generation industry is subject to regulations directly related to Occupational Health and Safety.

Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
UEENEEE101A	Apply Occupational Health Safety regulations, codes and practices in the workplace

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

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Employability Skills	**5)** The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Provide information to the work group about the organisation's Occupational Health and Safety policies and procedures.	1.1	Relevant provisions of Occupational Health and Safety legislation and codes of practice are accurately and clearly explained to the workgroup.
	1.2	Workplace procedures for dealing with accidents, fires and emergencies are completed, whenever necessary, within scope of responsibilities and competencies.
	1.3	Responsibilities and duties of employees in relation to the relevant Occupational Health & Safety legislation are demonstrated in day-to-day actions.
	1.4	Information about identified hazards and the outcome of risk assessment and risk control procedures is regularly provided and is accurately and clearly explained to the work group
	1.5	The workplace is maintained in a safe and clean condition following the enterprise procedures.

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ELEMENT		PERFORMANCE CRITERIA	
		1.6	Where appropriate, the teams and individuals roles and responsibilities within the team are identified, and, where required, assist in the provision of on-the-job training
2	Contribute to participative arrangements for Occupational Health and Safety in the workplace	2.1	Hazards in the work area are recognised and reported to designated personnel according to workplace procedures.
		2.2	Confirm Occupational Health and Safety issues are raised with designated personnel in accordance with workplace procedures and relevant Occupational Health and Safety legislation.
3	Confirm the organisation's procedures for identifying hazards and assessing risks are followed	3.1	Confirm that work procedures to control risks are implemented and adherence to them by the work group is monitored in accordance with workplace procedures
		3.2	Inadequacies in existing risk control measures are identified in accordance with the hierarchy of control and reported
		3.3	Inadequacies in resource allocation for implementation of risk control measures are identified and reported to designated personnel
4	Implement the organisation's procedure for maintaining Occupational Health and Safety records	4.1	Occupational Health and Safety records for work area are accurately and legibly completed in accordance with workplace requirements for Occupational Health and Safety records

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of complying with Occupational Health and Safety policy and procedures.

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REQUIRED SKILLS AND KNOWLEDGE

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO364A Compliance with Occupational Health and Safety policy and procedures

Evidence shall show that knowledge has been acquired for safe working practices of:

T1 Relevant Occupational Health and Safety regulations

T2 Relevant statutory legislation

T3 Relevant enterprise/site safety procedures

T4 Enterprise /site emergency procedures and techniques

T5 Environmental legislation

T6 Participative arrangements including the reporting of Occupational Health and Safety issue

T7 Provision of Occupational Health and Safety instructions to others

KS02-PO364A Compliance with Occupational Health and Safety policy and procedures

Specific skills needed to achieve the Performance Criteria:

T1 Apply relevant Occupational Health and Safety regulations

T2 Apply relevant statutory legislation

T3 Apply relevant enterprise/site safety procedures including identification of hazards and controlling of risks

T4 Apply enterprise /site emergency procedures and techniques

T5 Apply enterprise recording procedures

T6 Locate and/or identify relevant plant and equipment

T7 Apply enterprise recording procedures

T8 Communicate effectively.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of the competency standard unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

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Overview of Assessment **9.1)**

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit **9.2)**

Before the critical aspects of evidence are considered all

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prerequisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each Element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the Essential Knowledge and Associated Skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - employability skillsConduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Apply as a minimum, the following relative to the Elements and Performance Criteria of this competency standard unit on at least two occasions:
  - Evidence of recognition of potential hazards in the workplace.
  - Evidence that symbols are identified and used for Occupational Health and Safety signs.
  - Dealing with an unplanned event by drawing on Essential Knowledge and Skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials

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to undertake actual work as prescribed by this competency standard unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of and specific resources for assessment, evidence should show demonstrated competency working: in confined spaces with different types of plant and equipment as well as different structural/construction types and method and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.Note: Competent performance with inherent safe working practices is expected in the Industry to which this competency standard unit applies. This requires that the specified Essential Knowledge and Associated Skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the Essential Knowledge and Skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

Competency in this unit may be assessed concurrently with other units that require the application and implementation of Occupational Health and Safety policies and procedures.

Competence may need to be assessed in conjunction with units relating to communication competencies, particularly those relating to information provision.

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Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Demonstration of competency requires that an individual will have the ability to comply with workplace procedures in hazard identification and risk control, observe safe practices during work operations and participate in arrangements for maintaining health and safety of all individuals in the workplace.

In accordance with all relevant Occupational Health and Safety legislation, particularly general duty of care.

Relevant workplace procedures will include hazard policies and procedures; emergency, fire and accident procedures; procedures for the use of personal protective clothing and equipment; hazard identification and issue resolution procedures; and job procedures and work instructions.

Consultative arrangements could include Occupational Health and Safety Committees and / or emergency response teams

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations.

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UEPOPS368A Operate manual systems

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to operate plant in manual mode in conjunction with co-ordinated systems under the control of appropriate authorised personnel

Application of the Unit

Application of the Unit **2)**

This unit describes competencies applicable to employees working with minimal supervision in conjunction with authorised person in charge of the co-ordinated system.

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
UEPOPS252A	Undertake Local Systems Operations

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading	3	Writing	3	Numeracy	3

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

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Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT		PERFORMANCE CRITERIA	
1	Plan and prepare work	1.1	Safety issues are identified to comply with enterprise/site requirements
		1.2	Work requirements are identified from relevant personnel and documentation
		1.3	Plant status is identified and confirmed in accordance with enterprise/site requirements and documentation
		1.4	Pre-operational checks are carried out on plant according to manufacturer's recommendations and site requirements
		1.5	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training.
2	Operate plant	2.1	System component/s to be manually controlled identified and operated in accordance with site and or enterprise operating procedure
		2.2	Plant is operated within limits of plant design, enterprise or site requirements
		2.3	Plant is monitored and observed to detect deviations from normal operating conditions
		2.4	Corrective actions are taken to rectify abnormalities in accordance with manufacturer's and enterprise/site procedures
3	Complete documentation	3.1	Documentation is updated and plant problems, movements, abnormalities and status are reported and logged in accordance with

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ELEMENT **PERFORMANCE CRITERIA**

enterprise/site procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of operating local systems.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO368A Manual systems

Evidence shall show that knowledge has been acquired for safe working practices of:

T1 Relevant Environmental, Occupational Health and Safety legislation and regulations

T2 Enterprise procedures

T3 Plant drawings and manufacturers manuals

T4 Introduction to typical arrangements of power production plant and electrical systems

T5 Relevant plant and equipment, its location and operating parameters

T6 Relevant state and territory regulations

T7 Enterprise recording procedures

T8 Pump and motor types and characteristics

T9 Valves, dampers and actuators types and characteristics

KS02-PO368A Manual systems

Specific skills needed to achieve the Performance Criteria:

T1 Interpret plant drawings and manufacturers manuals

T2 Apply enterprise recording procedures;

T3 Identify plant status

T4 Operate plant/equipment

T5 Communicate effectively

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Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of the competency standard unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

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Critical aspects of evidence required to demonstrate competency in this unit **9.2)**

Before the critical aspects of evidence are considered all prerequisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each Element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the Essential Knowledge and Associated Skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - employability skillsConduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Knowledge and application of relevant sections of: Occupational, health and safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Preparation and planning of work
  - Local operation of plant/equipment
  - Dealing with an unplanned event by drawing on Essential Knowledge and Skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

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Context of and specific resources for assessment **9.3)**

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this competency standard unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working in confined spaces, with different types of plant and equipment as well as different structural/construction types and method and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this competency standard unit applies. This requires that the specified Essential Knowledge and Associated Skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the Essential Knowledge and Skills described in this unit.

Concurrent assessment and relationship with **9.5)**

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other units

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Plant and equipment may include electricity distribution system a.c. and d.c.; HV transformers; tap changers; HV switchgear; burner tilts; burner operations; precipitator plant; ash or dust plant; hydrogen/seal oil differential pressure controllers; stator temperature controller; hydrogen temperature controller; ammonia dosing controller; feed heater level controls; secondary air and flue gas dampers; turning gear barring equipment; rotary air heater barring equipment; sootblowing retracting equipment; reflux valve controls; condenser level controls; condenser backflushing equipment; oil temperature controllers; turbine gland sealing controllers; valves, actuators and dampers (electric, hydraulic, pneumatic and manual); supervisory, alarm and control equipment.

Safety standards may include relevant sections of Occupational Health and Safety legislation, enterprise safety rules, relevant state and federal legislation and national standards for plant.

Information and documentation sources may include verbal or written communications; enterprise safety rules documentation; enterprise operating instructions; dedicated computer equipment; enterprise/site standing and operating instructions; enterprise log books; manufacturer’s operation and maintenance manuals; and equipment and alarm manuals.

Technical and operational indicators may include stimuli (audio, smell, touch, visual), remote or local indicators and recorders, computers and alarms (visible and or audible).

Communications may be by means of telephone, two way radio, pager, computers (electronic mail) and operating log (written or verbal).

Tests may include stand-by plant tests and post maintenance operating tests.

Appropriate personnel to consult, give or receive direction may include supervisor/team leader or equivalent, system controller/power plant operator/unit controller or equivalent; technical and engineering officers or equivalent; maintenance

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RANGE STATEMENT

staff; other operating staff or equivalent.

Test, fault finding and operating tools may include high voltage testers, proving dead equipment, power or hand tools, control system equipment and specialised testing equipment.

Operating environment may be remote from plant and equipment being operated (operation is assisted by remote indicators of plant status and other parameter monitors), during inclement or otherwise harsh weather conditions, in wet/noisy/dusty/hot areas or during continuous operation.

Unit operations may include routine plant movement, spurious faults in automatic systems; automatic systems operating out of range and failure of automatic system component(s)...

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations.

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UEPOPS369A Respond to a critical incident

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to respond to an incident of a critical nature that may impact on the operational effectiveness of the plant or system, endanger human life or property, or have an adverse impact on the environment.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the

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Evidence Guide.

Elements and Performance Criteria

ELEMENT		PERFORMANCE CRITERIA	
1	Identify critical incident and consequences	1.1	Information and documentation to determine system status is interpreted in accordance with system requirements
		1.2	Fault location is determined by establishing, monitoring and evaluating system configuration and operational pre-requisites in accordance with enterprise procedures
		1.3	Fault information is collated in accordance with procedures to determine type and cause of failure
		1.4	System limitations and performance, including location and external influences, are identified
		1.5	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2	Stabilise the system	2.1	Appropriate response techniques are identified and used in accordance with requirements.
		2.2	Appropriate personnel and external stake holders are consulted in accordance with enterprise procedures prior to further action
		2.3	System requirements are assessed and controlled to maintain stability and system integrity
		2.4	Corrective actions to rectify abnormalities are implemented following interpretation of data in accordance with system procedures
3	Restore the system	3.1	Specialised assistance is identified and attended to where required in accordance with enterprise procedures
		3.2	Strategies to restore system integrity are identified and communicated in accordance with

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ELEMENT	PERFORMANCE CRITERIA	
		procedures to appropriate personnel
	3.3	Restoration strategy is undertaken, monitored and adjusted in accordance with procedure
4 Review response to incident	4.1	Effectiveness of response is interpreted in accordance with system procedures
	4.2	Incident and preventive measures are documented in accordance with procedures
	4.3	Relevant findings are communicated to appropriate key stake holders

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of responding to critical incidents/

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO369A Respond to a critical incident

Evidence shall show that knowledge has been acquired for safe working practices of:

T1 Relevant environmental, occupational health and safety legislation and regulations

T2 Enterprise procedures

T3 Plant drawings and manufacturers manuals

T4 Introduction to and typical arrangements of power production plant

T5 Relevant plant and equipment, its location and operating parameters

T6 Relevant state and territory regulations

T7 Plant status;

T8 Enterprise recording procedures;

T9 Contingency plans;

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REQUIRED SKILLS AND KNOWLEDGE

T10 Supervisory, alarm, protection and control equipment;

T11 Control and data acquisition systems;

KS02-PO369A Respond to a critical incident

Specific skills needed to achieve the Performance Criteria:

T1 Interpret plant drawings and manufacturers manuals

T2 Apply relevant state and territory regulations

T3 Apply enterprise recording procedures;

T4 Identify plant status;

T5 Communicate effectively;

T6 Apply data analysis techniques and tools;

T7 Identify and respond to abnormal system operating conditions;

T8 Plan and prioritise work;

T9 Apply stress management techniques;

T10 Apply diagnostic techniques.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment	**9.1)**
	Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the

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normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace

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procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
- Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
- Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
- Demonstrate an appropriate level of employability skills
- Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures

- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Preparing for system stabilisation
  - Stabilising and restoring system operations
  - Coordination requirements
  - Identifying and responding to abnormal system operating conditions
  - Policies for system incident and follow up procedures
  - Generation/transmission capability limits
  - Impact of actions
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace

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conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment

9.4)

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note: Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the unit of competency as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work

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RANGE STATEMENT

environments and situations that will affect performance.

Safety standards may include relevant sections of Occupational Health and Safety legislation, enterprise safety rules, relevant state and federal legislation, national standards for plant.

Information and documentation sources may include verbal or written communications; enterprise safety rules documentation; enterprise operating instructions; dedicated computer equipment; enterprise/site standing and operating instructions; enterprise log books; manufacturer operation and maintenance manuals; and equipment and alarm manuals

Technical and operational indicators may include stimuli (audio, smell, touch, visual), local indicators and recorders, computers and alarms (visible and or audible).

Communications may be by means of telephone, two way radio, pager, computer (electronic mail) and operating logs (written or verbal).

Appropriate personnel, team members/other authorities may include supervisor/team leader or equivalent, power plant operations personnel or equivalent, technical and engineering officers or equivalent, maintenance staff, other operating staff or equivalent, system controller, field operators, restricted operators, emergency personnel, network controllers/coordinators, generation controllers, plant operators, field operators, support staff, fire service, police, ambulance, emergency services, enterprise and site representatives and independent power producers.

Operating environment may be: remote from plant and equipment being operated (operation is assisted by remote indicators of plant status and other parameters monitored), during inclement or otherwise harsh weather conditions, in wet/noisy/dusty areas or during night periods.

Unit operations may include spurious faults in automatic systems, automatic systems operating out of range, failure of automatic system components and routine plant movement.

Types of incident may include localised black out, equipment fire, equipment leak, equipment faults/failure, accidents and life threatening situations

System conditions may be: voltage profiles, spare plant, generation/transmission capability limits, variation from normal trends and switching.

Documentation may include policy, procedure, standard operating instructions, contingency plans and emergency switching programs.

Liaison with key stake holders may be system/network controllers/coordinators, oncoming shift change, field operators, support staff, patrolmen, generation plant operators, on call staff, police, fire and emergency services and private systems.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

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Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations.

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UEPOPS370A Facilitate the use of contingency plans

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to facilitate the use of contingency plans developed to support the integrity of the enterprise.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships.

Pre-Requisites

Prerequisite Unit(s) **4)**

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Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT		PERFORMANCE CRITERIA	
1	Identify contingencies	1.1	Contingencies are identified from an assessment of functions which are critical to the performance of the team/enterprise task
		1.2	Contingencies plans are arranged in order of recommended priority and the contingencies to be used is identified
2	Identify preferred contingency options	2.1	Options for satisfying contingency needs are identified from assessment of critical functions
		2.2	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
3	Complete documentation	3.1	Documentation is updated and plant problems, movements, abnormalities and status are reported and logged in accordance with enterprise/site procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of developing contingency plans.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO370A Facilitate the use of contingency plans

Evidence shall show that knowledge has been acquired for safe working practices of:

T1 Relevant environmental, occupational health and safety legislation and regulations

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REQUIRED SKILLS AND KNOWLEDGE

T2 Enterprise procedures

T3 Plant drawings and manufacturers manuals

T4 Introduction to and typical arrangements of power production plant

T5 Relevant plant and equipment, its location and operating parameters

T6 Enterprise recording procedures

T7 Enterprise procedure

T8 Communication procedures

KS02-PO370A Facilitate the use of contingency plans

Specific skills needed to achieve the Performance Criteria:

T1 Interpret plant drawings and manufacturers manuals

T2 Apply enterprise recording procedures

T3 Communicate effectively

T4 Use data analysis techniques and tools

T5 Use diagnostic techniques

T6 Plan and prioritise work

T7 Develop contingency plans.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment

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intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline,

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work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:

- Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
- Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
- Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
- Demonstrate an appropriate level of employability skills
- Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures

- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Identifying contingency options
  - Developing contingency plan
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of

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work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment

9.4)

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the unit of competency as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Appropriate personnel for consultation may include supervisor/team leader or equivalent, power plant operations personnel or equivalent, technical and engineering officers or equivalent, maintenance staff, other operating staff or equivalent, system

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RANGE STATEMENT

controller/network controller, field operator, restricted H.V. operators and external stake holders.

Safety standards may include relevant sections of Occupational Health and Safety legislation, relevant state and federal legislation, national standards for plant and enterprise safety rules

Information and documentation sources may include verbal or written communications; enterprise safety rules documentation; enterprise operating instructions; dedicated computer equipment; enterprise/site standing and operating instructions; enterprise log books; manufacturer operation and maintenance manuals; and equipment and alarm manuals.

Communications may be by means of telephone, two way radio, pager, computer (electronic mail) and operating logs (written or verbal).

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations.

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UEPOPS371A Carry out operational checks on in-service electrical plant

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to conduct operational checks on in-service electrical plant.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety.

Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

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Prerequisite Unit(s) **4)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan for plant in-service checks	1.1 Safety issues are identified to comply with enterprise/site requirements
	1.2 Work, plant and resource requirements are identified from relevant information, requests, work orders or equivalent and documentation.
	1.3 Plant status and work requirements are clarified/confirmed with appropriate parties or by site inspection
	1.4 Equipment is check for correct calibration, operation. correct size, type and quantity of materials/components are determined, obtained and inspected for compliance with the job specifications
	1.5 Potential hazards are identified and prevention and/or control measures are selected in accordance with the work plan and site procedures
	1.6 Pre access checks are carried out in accordance with enterprise and site requirements
	1.7 Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2 Carry out in-service electrical checks	2.1 Systems/plant is operated in accordance with enterprise/site and manufacturer operating procedures
	2.2 In-service electrical checks are done in conjunction with others involved in, or affected by, the work in accordance with the work plan
	2.3 Plant checks are monitored and observed to detect deviations from normal operation
	2.4 In-service checks are performed in accordance with defined enterprise procedures.
	2.4 System/plant integrity and personnel safety are maintained through consultation with

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ELEMENT	PERFORMANCE CRITERIA	
		appropriate personnel, and reference to plant, technical and operational documentation
3 Complete the work	3.1	When checks are completed, control measures are returned to required operational status where appropriate.
	3.2	Appropriate personnel are notified of the completion of work in accordance with enterprise/site procedures
	3.3	Plant problems or abnormalities are reported and logged in accordance with enterprise/site procedures
	3.4	Check results are interpreted and documented in accordance with enterprise/site procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of conducting operational checks on in-service electrical plants.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO371A Operational checks on in-service electrical plant

Evidence shall show that knowledge has been acquired for safe working practices of:

T1 Relevant environmental, occupational health and safety legislation and regulations

T2 Enterprise procedures

T3 Plant drawings and manufacturers manuals

T4 Introduction to and typical arrangements of power production plant

T5 Relevant plant and equipment, its location and operating parameters

T6 Electric motor types and characteristics

T7 Switchgear types and characteristics

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REQUIRED SKILLS AND KNOWLEDGE

T8 Electrical protection types and characteristics

T9 Electrical fundamentals

T10 Transformers, types and characteristics

T11 Plant status

T12 Enterprise recording procedures

KS02-PO371A Operational checks on in-service electrical plant

Specific skills needed to achieve the Performance Criteria:

T1 Interpret plant drawings and manufacturers manuals

T2 Apply enterprise recording procedures

T3 Identify plant status

T4 Prepare plant/equipment for checks

T5 Communicate effectively

T6 Maintain plant integrity

T7 Apply data acquisition techniques and tools

T8 Recognise abnormal plant operating conditions

T9 Plan and prioritise work

T10 Interpret remote indication of plant status and condition

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment	**9.1)**
	Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best

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utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated

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within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:

- Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
- Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
- Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
- Demonstrate an appropriate level of employability skills
- Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures

- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

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In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment

9.4)

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines..

Note: Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the unit of competency as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Operational Checks may include fault finding, performance checking, indication and protection checks and checks on control and trip circuits and minor testing.

Work may be performed with equipment on line.

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RANGE STATEMENT

Key indicators may include frequency, machine/ equipment voltage and current, plant temperatures, reactive power flows, power factor, plant load capabilities, protection settings, visual and audible indicators, analogue and digital displays.

Plant and/or equipment may include electrical plant associated with turbines; generators; fans; pumps; heat exchangers; cooling systems; chemical treatment and water quality systems; fuel delivery system; auxiliary plant; fire protection system; and motors; transformers; switchgear; electrical/electronic control systems; generator excitation system; and switchboards.

Safety standards may include relevant sections of Occupational Health and Safety legislation, enterprise safety rules, national standards for plant, relevant state and federal legislation and Australian standards.

Information and documentation sources may include verbal or written communications; enterprise safety rules documentation; enterprise operating instructions; equipment and alarm manuals; dedicated computer equipment; enterprise standing instructions and plant notes; enterprise log books; manufacturer operation and maintenance manuals.

Technical and operational indicators may include stimuli (audio, smell, touch, visual), remote or local indicators and recorders, computers and alarms (visible and or audible)

Appropriate personnel for consultation, to give or receive direction may include supervisor/team leader or equivalent; other coordinators of energy production; other operating staff; technical and engineering officers or equivalent; maintenance personnel; and contractor staff.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations.

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UEPOPS372A Operate and Monitor Generator/Alternator Auxiliary Plant

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to operate, inspect and monitor of a Generator/Alternator Auxiliary Plant, including Stator Water Systems, Hydrogen Cooling Systems, Seal Oil and Lubricating Oil Systems.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no prerequisite units

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Plan and prepare work	1.1	Safety issues are identified to comply with enterprise/site requirements
	1.2	Work, plant and type of start requirements are identified from relevant personnel and documentation
	1.3	The turbine running-up and loading schedule are ascertained from relevant documentation and in accordance with enterprise/site requirements
	1.4	Localised plant inspection, pre operational tests and field preparation for service are carried out in accordance with manufacturer and enterprise/site procedures
	1.5	Plant operational prerequisites are established in accordance with manufacturer and enterprise/site procedures
	1.6	Sequence for recommissioning of plant is determined to suit existing circumstances in accordance with enterprise/site requirements
2 Operate plant	2.1	Plant is operated within limits of plant design, regulators requirements, enterprise or site requirements
	2.2	Plant is monitored and observed to detect deviations from required operating conditions
	2.3	Corrective actions are taken to rectify abnormalities in accordance with manufacturer and enterprise/site procedures
3 Test plant operation	3.1	Tests are performed in accordance with defined procedures applicable to the operational test
	3.2	System and plant is observed for correct operational response
	3.3	Correct action is taken when response is not in accordance with documentation, plant integrity or personnel safety requirements

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ELEMENT		PERFORMANCE CRITERIA	
		3.4	Plant is returned to required operational status upon completion of test
4	Analyse plant faults	4.1	Cause of abnormal plant operating conditions are identified by analysing the technical and operational information in a logical and sequential manner
		4.2	Actions necessary to rectify fault are correctly determined
		4.3	Plant integrity and personnel safety is maintained through consultation with appropriate personnel, and reference to plant, technical and operational documentation
5	Monitor and inspect plant	5.1	Plant to be monitored/inspected is physically identified
		5.2	Plant is monitored/inspected for normal operation or to detect deviations
		5.3	Corrective action taken is in accordance with enterprise procedures
		5.4	Appropriate personnel are notified when defects are detected
6	Complete documentation	6.1	Documentation is updated and plant problems, movements, abnormalities and status are reported and logged in accordance with enterprise/site procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of operating a generator/alternator.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO372A Generator/Alternator Auxiliary Plant

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REQUIRED SKILLS AND KNOWLEDGE

Evidence shall show that knowledge has been acquired for safe working practices of:

T1 Safety legislation and regulations

T2 Enterprise procedures

T3 Plant drawings and manufacturers manuals

T4 Introduction to and typical arrangements of power production plant

T5 Relevant plant and equipment, its location and operating parameters

T6 Electric motor types and characteristics

T7 Generator/alternator cooling systems types and characteristics

T8 Pump and compressor types and characteristics

T9 Switchgear types and characteristics

T10 Electrical protection types and characteristics

T11 Control and data acquisition systems

T12Electrical fundamentals

T13 Heat exchanger types and characteristics

T14 lubrication systems and oil conditioning systems types and characteristics

KS02-PO372A Generator/Alternator Auxiliary Plant

Specific skills needed to achieve the Performance Criteria:

T1 Interpret plant drawings and manufacturers manuals

T2 Apply relevant state and territory regulations

T3 Apply enterprise recording procedures

T4 Identify plant status

T5 Prepare plant/equipment for operation

T6 Organise resources

T7 Apply diagnostic and testing techniques

T8 Identify and respond to abnormal plant operating conditions

T9 Plan and prioritise work

T10 Use relevant hand tools

T11 Communicate effectively

T12 Apply data analysis techniques and tools

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Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

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Critical aspects of evidence required to demonstrate competency in this unit **9.2)**

Before the critical aspects of evidence are considered all prerequisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of Performance Criteria demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - employability skillsConduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Preparation and planning of work
  - Operation of generator/alternator unit
  - Operationally testing plant
  - Analysing plant faults
  - Monitoring plant operation
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions

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incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment **9.3)**

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note: Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and **9.5)**

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relationship with other units

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the unit of competency as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Generator/alternator plant and equipment may include Cooling water systems; Lubrication systems; supervisory, alarm and control equipment; electrical motors, fans and pumps; electrical supply and distribution systems; fire protection equipment; heat exchangers, filters and strainers; transformers; water drainage systems; and environmental protective systems.

Prime movers may include Steam turbine; Gas turbine; Hydro turbine; Wind turbine and reciprocating engine.

Safety standards may include relevant sections of Occupational Health and Safety legislation, enterprise safety rules, relevant state and federal legislation, national standards for plant and Australian standards and enterprise safety procedures and practices.

Information and documentation sources may include verbal or written communications; enterprise safety rules documentation; enterprise operating instructions; dedicated computer equipment; enterprise/site standing and operating instructions; enterprise log books; manufacturer operation and maintenance manuals; and equipment and alarm manuals.

Technical and operational indicators may include stimuli (audio, smell, touch, visual), remote or local indicators and recorders, computers and alarms (visible and or audible).

Tests may include, Control system operation tests, Oil quality test and Cooling system tests

Communications may be by means of telephone, two way radio, pager, computer (electronic mail) and operating logs (written or verbal).

Appropriate personnel to consult, give or receive direction may include, supervisor/team leader , Network regulator, engineering officer, maintenance office or

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RANGE STATEMENT

equivalent, technical and officers, contractor staff, maintenance staff,

Test, fault finding and operating tools may include low testers, proving dead equipment, powered or non-powered hand tools.

Operating environment may be remote from plant, aided by indicators and monitors, during inclement or otherwise harsh weather conditions, in wet/noisy/dusty/hot areas, during night periods or locally aided by visual and audible indicators.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations.

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UEPOPS402B Conduct multiple energy source isolation procedures for permit to work

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required for the application of permit to work procedures where multiple energy sources require isolation for safe access to high voltage, low voltage or mechanical apparatus.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It describes generic isolation and access procedures for the maintenance and operation of plant at the enterprise level.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
UEPOPS301B	Conduct single energy source isolation procedures for permit to work.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 4 Writing 4 Numeracy 4

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

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Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and prepare for isolation, de-isolation and restoration	1.1 Work requirements are identified from request/work orders or equivalent and clarified/confirmed with the appropriate parties or by site inspection
	1.2 Safety issues are identified to comply with statutory, enterprise and site requirements
	1.3 Materials, equipment and resources required to satisfy the job plan are identified, requisitioned, obtained and inspected for compliance with job specifications
	1.4 Work is planned in detail with the responsible issuing officer, including sequencing and prioritising of work, and the maintenance of plant security and capacity in accordance with permit/site requirements
	1.5 Job requirements including permits/risk assessment are coordinated with other personnel involved in, or affected by, the isolation in accordance with enterprise/site requirements
	1.6 Where appropriate the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of on-the-job training
2 Perform isolation	2.1 Plant to be isolated is correctly identified
	2.2 Isolation is performed in accordance with enterprise/site permit to work procedures
	2.3 Verify the effectiveness of the isolation, dissipation and restraint of energy sources in

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ELEMENT	PERFORMANCE CRITERIA	
		accordance with enterprise/site procedures
	2.4	Isolations are confirmed with others involved in, or affected by, the work in accordance with enterprise/site procedures
3 Perform de-isolation and restoration	3.1	De-isolation and restoration of plant is performed in accordance with permit to work procedures
	3.2	De-isolations are confirmed with others involved in, or affected by, the work in accordance with enterprise/site procedures
	3.3	Work completion details are finalised in accordance with enterprise/site procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired conducting multiple energy source isolation procedures for permit to work.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO 402B Multiple energy source isolation procedures for permit to work

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant environmental, occupational health and safety legislation and regulations
- Enterprise procedures
- Plant drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Relevant plant and equipment, its location and operating parameters
- Relevant state and territory regulations
- Plant status
- Mechanical equipment isolation techniques

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REQUIRED SKILLS AND KNOWLEDGE

- Electrical equipment isolation techniques
- Mechanical isolation equipment types and characteristics
- Electrical isolation equipment types and characteristics
- Enterprise recording procedures
- Isolating procedures
- Electrical principles
- Auxiliary supply systems
- Safe operating principles

T2 Specific skills needed to achieve the Performance Criteria:

- Interpret plant drawings and manufacturers manuals
- Apply relevant state and territory regulations
- Apply enterprise recording procedures
- Identify plant status
- Prepare plant/equipment for operation
- Communicate effectively
- Apply isolating procedures
- Plan and prioritise work

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment	**9.1)**
	Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work

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environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace

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procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
    - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
    - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
    - Demonstrate an appropriate level of employability skills
    - Conduct work observing the relevant Anti-Discrimination legislation, regulations, polices and workplace procedure
- Demonstrated performance across a representative range of contexts from the prescribed items below:
    - The knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures, Applying isolation procedures
    - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working in limited spaces with different types of plant and equipment as well as different

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structural/construction types and methods and in a variety of environments.

Method of assessment

9.4)

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note: Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills.

Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

UEPOPS301 B	Conduct single energy source isolation procedures for permit to work

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole, providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Other personnel involved may include issuing officer, isolating officers, recipient in charge and testing officer or their equivalent.

Work completion details may include log books, computer input.

Gaining access to specific HV apparatus.

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RANGE STATEMENT

ESAA Safe isolation and Access Guidelines.

Permits may include any documentation/forms approved for use by the enterprise safety rules and permit to work procedures.

Plant flow diagrams, single line diagrams, protection diagrams, manufacturers manuals

Energy sources may include but not be limited to Electrical (HV) (LV), Mechanical, Electrical, Refrigeration (CFC) and Radioactive Sources.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations.

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UEPOPS403B Coordinate permit to work system

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to coordinate the permit to work system, its implementation and application on a day to day basis and during major outages and projects.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety.

Pre-Requisites

Prerequisite Unit(s) **4)**

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Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
UEPOPS402B	Conduct multiple energy source isolation procedures for permit to work

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading	4	Writing	4	Numeracy	4

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

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Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT		PERFORMANCE CRITERIA	
1	Implement permit to work procedures	1.1	Work requirements are identified from relevant personnel and documentation
		1.2	Permit to work is planned and prepared to achieve the defined work requirement in accordance with statutory, enterprise and site procedures
		1.3	Plant isolations are coordinated and confirmed with the appropriate personnel
		1.4	Issue, cancellation and recording of the permit to work is carried out in accordance with enterprise and site procedures
		1.5	Plant de-isolation and restoration is coordinated and confirmed with the appropriate personnel
		1.6	Documentation is completed in accordance with enterprise/site requirements
		1.7	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of on-the-job training
2	Coordinate outage permit to work requirements	2.1	Outage plan is obtained from, and confirmed with, the appropriate personnel
		2.2	Critical paths, major milestones and potential conflicts between permits are identified and assessed
		2.3	Permit to work plan is created and structured to achieve outage targets

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ELEMENT	PERFORMANCE CRITERIA	
	2.4	Permits are planned in accordance with statutory, enterprise/site procedures
	2.5	Resources are identified, obtained and utilised to ensure outage plan is maintained
	2.6	Issue and cancellation of permits is controlled and coordinated in accordance with work requirements
	2.7	De-isolation and restoration of plant is planned and coordinated to meet recommissioning targets
	2.8	Records are maintained during the outage in accordance with enterprise/site requirements
3 Manage permit to work system	3.1	Permit to work system is monitored and reviewed, and results are evaluated in accordance with enterprise procedures
	3.2	Results are documented and reports are confirmed with the appropriate personnel
	3.3	Permit to work system incidents are identified
	3.4	Permit to work incidents are investigated and assessed in accordance with enterprise procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired co-ordinating permit to work systems.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO403B Permit to work system

T1 Evidence shall show that knowledge has been acquired for safe working practices

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REQUIRED SKILLS AND KNOWLEDGE

of:

- Relevant environmental, occupational health and safety legislation and regulations
- Enterprise procedures and policies
- Plant drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Relevant plant and equipment, its location and operating parameters
- Mechanical equipment isolation techniques
- Electrical equipment isolation techniques
- Mechanical isolation equipment types and characteristics
- Electrical isolation equipment types and characteristics
- Electrical principles
- Relevant state and territory regulations
- Plant status
- Enterprise recording procedures
- Auditing procedures and techniques
- Investigation and evaluating techniques
- Development and management techniques
- Human resources and management principles
- Electrical principles

T2 Specific skills needed to achieve the Performance Criteria:

- Interpret plant drawings and manufacturers manuals
- Apply relevant state and territory regulations
- Locate relevant plant and equipment
- Identify plant status
- Plan and prioritise work
- Apply planning principles and techniques
- Communicate effectively
- Apply data analysis techniques and tools
- Develop and manage permit to work systems
- Manage human resources.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

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EVIDENCE GUIDE

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be ‘rich’ in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its ‘richness’. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to **9.2)**

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demonstrate competency in this unit

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti-Discrimination legislation, regulations, polices and workplace procedure
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The knowledge and application of relevant sections of:
  - Occupational Health and Safety legislation
  - Statutory legislation
  - Enterprise/site safety procedures
  - Enterprise/site emergency procedures
  - Implementing permit to work system
  - Coordinating permit to work system
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

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Context of and specific resources for assessment **9.3)**

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working in limited spaces with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note: Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

There are no recommended concurrent assessments with this unit,

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however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole, providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Appropriate personnel may include project engineers and leaders, maintenance personnel, operations personnel, internal and external specialist services personnel, line management, contractors and standing permit to work and/or safety committees.

Documentation may include Occupational Health and Safety and environmental legislation, industry standards, enterprise safety and/or permit to work rules, enterprise and site procedures, enterprise permit to work documentation/form(s), operation and maintenance manuals, plant drawings and schematics and computer based software packages.

Resources may include approved documentation/form(s), manpower, isolation equipment (locking devices, signs etc.) and personal or mainframe computers.

Permit to work may include any approved documentation/form(s) controlled by the safety rules or permit to work procedures of the candidate's enterprise.

Auditing may include quantity, quality and suitability of permits and isolation procedures.

Incidents may refer to permit to work system breaches.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

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Competency Field

Competency Field **11)**

Operations

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UEPOPS404B Coordinate first response team operation

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to coordinate the operations of a first response team.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It would be applicable to those that have a supervisory role with an emphasis on implementing workplace safety procedures. It requires individuals to coordinate at site emergency response procedures and the ability to communicate with external emergency response agencies.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
UEPOPS210B	Conduct first response within a workplace team

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 4 Writing 4 Numeracy 4

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

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Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT		PERFORMANCE CRITERIA	
1	Coordinate the workplace emergency team	1.1	The purpose of the team is identified and, where necessary, clarified with relevant people
		1.2	The duties and responsibilities of team members are identified
		1.3	Instructions from supervising team members are carried out in accordance with enterprise/site procedures
		1.4	Team members are supported in relation to duties and responsibilities
		1.5	Appropriate team member identification is displayed in accordance with procedures
2	Cooperate with other emergency service(s) personnel	2.1	The roles and responsibilities of emergency service(s) personnel are clarified, where necessary
		2.2	Role and authority of emergency services is conveyed to other team members
		2.3	Instructions from relevant emergency services personnel are clarified and complied with
		2.4	Guidance and assistance for emergency services is provided in accordance with enterprise/site procedures
		2.5	Directions and advice are given to emergency service personnel and team members after appropriate site inspection
		2.6	A plan to ensure personnel safety and plant integrity is developed in accordance with

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ELEMENT	PERFORMANCE CRITERIA	
		statutory, industry and site standards
	2.7	Relevant documentation is obtained in accordance with procedures
	2.8	Materials, equipment and resources required to satisfy the job are identified and obtained
3 Evaluate the emergency	3.1	Nature, extent and cause of the emergency is identified in accordance with procedures
	3.2	Potential risk to personnel, equipment, environment and production is identified
	3.3	Notification of emergency is undertaken in accordance with authorised procedures
	3.4	Emergency evacuation procedures are followed where appropriate
	3.5	Requirement for special expert assistance is identified
	3.6	Incident is evaluated to prevent repetition of risk
	3.7	Location of emergency is identified and most effective route to emergency is determined
4 Respond to emergency	4.1	Vehicles and buildings are secured and protected in accordance with site procedures
	4.2	Potential sources of danger are isolated and warning signs/signals and barriers are put in place in accordance with site/enterprise procedures
	4.3	Emergency responses are applied in accordance with site and/or enterprise safety procedures
	4.4	Materials, equipment and resources required to satisfy the job are identified and obtained
	4.5	Effective lines of communication are established if required
	4.6	The use of personal protective clothing, equipment and/or procedures is monitored in accordance with procedures

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ELEMENT	PERFORMANCE CRITERIA	
	4.7	Technical advice to emergency service personnel is given in accordance with procedures
5 Report outcomes of emergency response	5.1	Fire and emergency equipment is marked or positioned after use, in accordance with procedures, to indicate it requires servicing or replacing
	5.2	The use of emergency equipment is reported according to procedures
	5.3	De-briefing is attended and responded to in accordance with procedures
	5.4	Effectiveness of emergency response is evaluated and recommendations are submitted for consideration

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired co-ordinating first response team operation.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO404B First response team operation

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant Occupational Health and Safety regulations
- Relevant statutory legislation
- Relevant enterprise/site safety procedures Enterprise/site emergency procedures and techniques
- Plant status
- Relevant plant and equipment, its location and operating parameters
- Site communications systems
- First Aid

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REQUIRED SKILLS AND KNOWLEDGE

- Appropriate warning signs
- Equipment appropriate for the task
- Operation of emergency stations
- Roles of the emergency team and its members
- Classifications of fires and emergencies
- Roles and responsibilities of emergency services
- Fire fighting and rescue principles and techniques
- Communication principles
- Human resources and management principles within a team
- Material safety data sheets and emergency services

T2 Specific skills needed to achieve the Performance Criteria:

- Apply relevant Occupational Health and Safety regulations
- Apply relevant statutory legislation
- Apply relevant enterprise/site safety procedures
- Apply enterprise/site emergency procedures and techniques
- Locate relevant plant and equipment
- Prepare emergency plant/equipment for operation
- Communicate effectively
- Plan and prioritise work
- Work in a team
- Apply First Aid and resuscitation techniques
- Apply emergency and evacuation procedures
- Identify and operate appropriate emergency communications equipment
- Apply emergency techniques and procedures.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

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Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with

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the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement OHS workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti-Discrimination legislation, regulations, polices and workplace procedure
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The knowledge and application of relevant sections of:
  - Occupational Health and Safety legislation;
  - Environmental legislation;
  - Statutory legislation;
  - Enterprise/site safety procedures;
  - Enterprise/site emergency procedures
  - The ability to apply leadership skills
  - The ability to communicate effectively with the appropriate personnel and agencies during an emergency
  - The knowledge of potential hazards during response
  - The knowledge and application of fire fighting and rescue principles and techniques
  - The ability to respond to an emergency situation
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment **9.3)**

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This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working in limited spaces with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

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Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole, providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

May include life or plant threatening incidents such as fire, rescue, hazardous substances, explosions, bomb alerts, terrorists, radiation, natural disasters, environmental, electrical storms/incidents, accidents, electrical equipment, structural, security related incidents.

Special assistance may be on site personnel (e.g. chemists, fire team), rescue team, environmental officer, safety officer, radiation officer floor warden or equivalent, chief warden or equivalent and security staff.

External emergency groups may include police, fire brigade, ambulance, state emergency service supply authorities (such as water utility).

Communications may be by means of verbal, telephone system, two-way radio, pager, emergency public address system, radio, facsimile, computer (electronic mail), enterprise/site log book, whistle or hand signal.

Additional resources may include personnel, fire fighting equipment, fire fighting protective clothing, chemical protective clothing, air cylinders for breathing apparatus, rescue equipment, fire retardant compounds, oil containment materials/equipment, vehicles for transport of materials or personnel, stand-by air compressors, storm water pumps, gas monitoring equipment, communication equipment, ladders, spill kits, salvage gear and forcible entry tools.

Site hazards may include power lines, trees, overhead service lines, abnormal weather conditions, dangerous materials/chemicals, earthworks/obstructions, underground services, hazardous substances and electrical, thermal, explosive and structural hazards.

Technical advice may include plant layout, plant location, isolation points, location and quantity of hazardous substances and location of fire hydrants, pumps and water supplies.

Information and documentation sources may include verbal and written communications, enterprise/site operating instructions, equipment manufacturer’s recommendations, dedicated computer equipment and enterprise/site log books.

Personnel refers to all people on site at the time of the emergency and may include supervisory, maintenance and operational staff, contractors, trainees and visitors.

Operating environment may be during inclement or otherwise harsh weather conditions, in wet/noisy/dusty/hot areas or during night periods.

Technical and operational indicators may include stimuli (audio, smell, touch, visual),

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RANGE STATEMENT

computers and alarms (visible and or audible).

Safety standards may include relevant sections of Occupational Health and Safety legislation, enterprise safety rules, national standards for plant and relevant State and federal legislation.

Identification may include helmets, armbands, vests and other apparel.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations

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UEPOPS405B Operate and monitor a.c. electrical systems

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to operate and monitor local and remote operation of a.c. electrical switchgear, switchboards and distribution systems including transformers.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 4 Writing 4 Numeracy 4

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the

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Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and prepare for switching operations	1.1 Safety issues are identified to comply with enterprise/site and legislative requirements
	1.2 Work requirements are identified from relevant personnel and documentation
	1.3 Documentation to determine plant status is assessed and evaluate
	1.4 Localised plant/equipment inspection, pre-operational checks and field preparation for service are carried out in accordance with manufacturer's and enterprise/site procedures
	1.5 Switchboard/equipment operational pre-requisites and switching sequences are established in accordance with manufacturer's and enterprise/site procedures
	1.6 Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2 Carry out operation of switchgear, switchboards	2.1 Operation of switchgear is carried out in accordance with manufacturer's and enterprise/site procedures and programmes
	2.2 Isolation, removal and reinstatement of switchgear/switchboards/rectification systems is carried out in accordance with manufacturer's and enterprise/site procedures
	2.3 Paralleling/balancing requirements are assessed and met to ensure system stability
	2.4 Rectification system is operated, isolated and reinstated in accordance with manufacturer's and enterprise/site procedures

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ELEMENT		PERFORMANCE CRITERIA	
3	Test switchgear and equipment operation	3.1	Tests are performed in accordance with defined procedures applicable to the operational test
		3.2	Switchgear and equipment is observed for correct operational response
		3.3	Corrective action is taken when response is not in accordance with documentation, system integrity or personnel safety requirements
		3.4	Switchgear equipment is returned to required operational status upon completion of test
4	Analyse system, switchgear and equipment faults	4.1	Causes of abnormal system/switchgear operating conditions are identified by analysing the technical and operational information in a logical and sequential manner
		4.3	Corrective action taken is in accordance with enterprise/site procedures
		4.4	System/switchgear/plant integrity and personnel safety are maintained through consultation with appropriate personnel, and reference to plant, technical and operational documentation
5	Inspect and monitor system and switchboards	5.1	System/switchgear to be monitored/ inspected is physically identified
		5.2	System/switchgear is monitored /inspected for normal operation or to detect deviations
		5.3	Corrective action taken is in accordance with enterprise/site procedures
		5.4	Appropriate personnel are notified when defects and abnormal operating conditions are detected
6	Complete documentation	6.1	Documentation is updated and equipment problems, abnormalities and status are reported and logged in accordance with enterprise/site procedures

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired operating and monitoring a.c. electrical systems.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO405B A.C. electrical systems

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant environmental, occupational health and safety legislation and regulations
- Enterprise procedures
- Plant drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Relevant plant and equipment, its location and operating parameters
- Plant status;
- Enterprise recording procedures
- Control and data acquisition systems
- Computers and software
- Supervisory, alarm, protection and control equipment
- Switchboard(s), switch yard(s) and ring main(s) layout and configuration
- Switchgear types and characteristics
- Electrical protection types and characteristics
- Relevant state and territory regulations
- Electrical protection equipment, types and characteristics
- Plant status;
- Enterprise procedures;
- Circuit breaker construction and operation;
- Switchgear - operation, isolation and earthing
- Protection - systems, types and function
- Switching practices and procedures
- Electrical principles
- Transformers types and characteristics
- Electric motors types and characteristics
- a.c. generators types and characteristics
- Heating of electrical equipment
- Auxiliary supply systems

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REQUIRED SKILLS AND KNOWLEDGE

T2 Specific skills needed to achieve the Performance Criteria:

- Interpret plant drawings and manufacturers manuals
- Apply enterprise recording procedures;
- Identify plant status
- Prepare plant/equipment for operation
- Organise resources
- Operate switchgear and equipment
- Conduct switching operations
- Apply diagnostic and testing techniques
- Identify and respond to abnormal plant operating conditions
- Plan and prioritise work
- Use relevant hand tools
- Communicate effectively
- Apply data analysis techniques and tools
- Produce and/or assess internal and external switching procedures
- Assess and evaluate protection operation and determine the appropriate response.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency

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in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control

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measures as specified in the Performance Criteria and Range Statement
    - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
    - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
    - Demonstrate an appropriate level of employability skills
    - Conduct work observing the relevant Anti-Discrimination legislation, regulations, polices and workplace procedure
- Demonstrated performance across a representative range of contexts from the prescribed items below:
    - The knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
    - Preparation and planning of work
    - Operation of switch gear
    - Conducting switching operations
    - Operationally testing plant
    - Analysing equipment, system and protection faults
    - Monitoring equipment, system and protection operation
    - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary

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evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working in limited spaces with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments

Method of assessment

9.4)

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note::

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole, providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

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RANGE STATEMENT

Systems, plant and or equipment may include high and low voltage switchboards/yards/ring mains; supervisory, control and protection equipment; circuit breakers, air, air blast, minimum oil, bulk oil, SF6, vacuum, transformers, oil natural air natural (ONAN), oil natural air forced (ONAF), oil forced air forced (OFAF), dry type, earthing and neutral, voltage and current; Isolators, load breaking, non-load breaking; combined fuse switches (CFS), with or without contactor units; low voltage equipment, fuses, mini circuit breakers, contactors; switchboard/yard auxiliary supplies, control, supervision, protection, indication; earthing systems, earthing circuit breakers, integral earths, earth switches, portable earths and protection systems.

Safety standards may include relevant sections of Occupational Health and Safety legislation, enterprise safety rules, relevant State and federal legislation and national standards for plant.

Information and documentation sources may include verbal or written communications; enterprise safety rules documentation; dedicated computer equipment; enterprise/site standing and operating instructions; enterprise log books; manufacturer's operation and maintenance manuals; and equipment and alarm manuals.

Technical and operational indicators may include stimuli (audio, smell, touch, visual), local indicators and recorders, computers and alarms (visible and or audible).

Communications may be by means of telephone, two way radio, pager, public address system, computer (electronic mail) and operating log (written or verbal).

Tests may include post maintenance operating tests, interlock tests, protection tests, alarm tests and emergency/black start checks.

Appropriate personnel to consult, give or receive direction may include supervisor/team leader or equivalent, technical and engineering officers or equivalent, power system control personnel or equivalent, power plant operations personnel, maintenance staff, contractor and specialist staff.

Test, fault finding and operating tools may include voltage testers, proving dead equipment, power or hand tools, control system equipment and fuse testers/multimeters.

Operating environment may be during inclement or otherwise harsh weather conditions, in wet/noisy/dusty/hot areas or during night periods.

Faults and abnormal operating conditions may include switch yard protection operation, switchboard protection operation, transformer protection operation, circuit/feeder protection operation; transformer faults, low oil level, loss of fans/pumps; circuit breaker faults, loss of supervisory/control supplies, low gas/oil/air pressure, failure of pump/motors and fuse failure.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

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Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations

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UEPOPS406B Operate and monitor d.c. electrical systems

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to operate and monitor the local and remote operation of DCd.c. electrical switchgear, ring mains, switchboards, rectification and distribution systems.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 4 Writing 4 Numeracy 4

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the

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Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and prepare for switching operations	1.1 Safety issues are identified to comply with enterprise/site and legislative requirements
	1.2 Work requirements are identified from relevant personnel and documentation
	1.3 Documentation to determine plant status is assessed and evaluate
	1.4 Localised plant/equipment inspection, pre-operational checks and field preparation for service are carried out in accordance with manufacturer's and enterprise/site procedures
	1.5 Switchboard/equipment operational pre-requisites and switching sequences are established in accordance with manufacturer's and enterprise/site procedures
	1.6 Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2 Carry out operation of switchgear, switchboards and rectification systems	2.1 Operation of switchgear is carried out in accordance with manufacturer's and enterprise/site procedures and programmes
	2.2 Isolation, removal and reinstatement of switchgear/switchboards/rectification systems is carried out in accordance with manufacturer's and enterprise/site procedures
	2.3 Paralleling/balancing requirements are assessed and met to ensure system stability
	2.4 Rectification system is operated, isolated and reinstated in accordance with manufacturer's and enterprise/site procedures

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ELEMENT	PERFORMANCE CRITERIA
3 Test switchgear and rectification equipment operation	3.1 Tests are performed in accordance with defined procedures applicable to the operational test
	3.2 Switchgear and/or rectification equipment is observed for correct operational response
	3.3 Corrective action is taken when response is not in accordance with documentation, system integrity or personnel safety requirements
	3.4 Switchgear and/or rectification equipment is returned to required operational status upon completion of test
4 Analyse system, switchgear and rectification equipment faults	4.1 Causes of abnormal system/switchgear operating conditions are identified by analysing the technical and operational information in a logical and sequential manner
	4.3 Corrective action taken is in accordance with enterprise/site procedures
	4.4 System/switchgear/plant integrity and personnel safety are maintained through consultation with appropriate personnel, and reference to plant, technical and operational documentation
5 Inspect and monitor system and switchboards	5.1 System/switchgear to be monitored/ inspected is physically identified
	5.2 System/switchgear is monitored /inspected for normal operation or to detect deviations
	5.3 Corrective action taken is in accordance with enterprise/site procedures
	5.4 Appropriate personnel are notified when defects and abnormal operating conditions are detected
6 Complete documentation	6.1 Documentation is updated and equipment problems, abnormalities and status are reported and logged in accordance with enterprise/site procedures

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired operating and monitoring d.c. electrical systems.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO406B D.C. electrical systems

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant environmental, occupational health and safety legislation and regulations
- Enterprise procedures
- Plant drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Relevant plant and equipment, its location and operating parameters
- Plant status;
- Enterprise recording procedures;
- Control and data acquisition systems;
- Supervisory, alarm, and control equipment;
- Switchboard(s), and ring main(s) layout and configuration;
- d.c. Switchgear types and characteristics
- Interlocks and inter-tripping systems;
- Rectifiers and battery systems types and characteristics
- Electrical principles
- d.c. Electric motors types and characteristics
- UPS systems types and characteristics
- Heating of electrical equipment;
- Electrical protection
- Auxiliary supply systems
- Safe operating principles
- Inverters and rectifiers types and characteristics

T2 Specific skills needed to achieve the Performance Criteria:

- Interpret plant drawings and manufacturers manuals
- Apply enterprise recording procedures;
- Identify plant status;
- Prepare plant/equipment for operation;

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REQUIRED SKILLS AND KNOWLEDGE

- Organise resources;
- Operate switchgear and equipment;
- Apply diagnostic and testing techniques;
- Identify and respond to abnormal plant operating conditions;
- Plan and prioritise work;
- Use relevant hand tools;
- Communicate effectively;
- Apply data analysis techniques and tools;

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being

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assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti-Discrimination

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legislation, regulations, polices and workplace procedure

- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedure
  - Preparation and planning of work
  - Operation of switch gear
  - Conducting switching operations
  - Operationally testing plant
  - Analysing equipment, system and protection faults
  - Monitoring equipment, and system operation
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working in limited spaces with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

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Method of assessment **9.4)**

This unit shall be assessed by methods given Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole, providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Systems, plant and/or equipment may include d.c. switchboards and ring mains; supervisory, control and protection equipment; UPS systems, circuit breakers; load breaking isolators; non-load breaking isolators; d.c. motors, combined fuse switches (CFS) with or without contactor units; low voltage equipment; fuses; mini circuit breakers; contactors; switchboard auxiliary supplies; indication; earth leakage detection systems; rectifiers; static; generators; batteries and battery banks; inverters; d.c. lighting systems and metering.

Operation of the equipment may include earthing

Safety standards may include relevant sections of Occupational Health and Safety

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RANGE STATEMENT

legislation, enterprise safety rules, relevant State and federal legislation and national standards for plant.

Information and documentation sources may include verbal or written communications; enterprise safety rules documentation; dedicated computer equipment; enterprise/site standing and operating instructions; enterprise log books; manufacturer's operation and maintenance manuals; and equipment and alarm manuals.

Technical and operational indicators may include stimuli (audio, smell, touch, visual), local indicators and recorders, computers and alarms (visible and or audible).

Communications may be by means of telephone, two way radio, pager, public address system, computer (electronic mail) and operating log (written or verbal).

Tests may include post maintenance operating tests, interlock tests, alarm tests and emergency/black start checks.

Appropriate personnel to consult, give or receive direction may include, supervisor/team leader or equivalent, technical and engineering officers or equivalent, power system control personnel or equivalent, power plant operations personnel, maintenance staff, contractor and specialist staff.

Test, fault finding and operating tools may include voltage testers, proving dead equipment, power or hand tools, control system equipment and fuse testers/multimeters.

Operating environment may be during inclement or otherwise harsh weather conditions, in wet/noisy/dusty areas or during night periods.

Faults and abnormal operating conditions may include; circuit breaker faults; loss of supervisory/control supplies; fuse failure; and earth faults.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations

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UEPOPS407B Start and Run Up A Gas Turbine

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required for the purging, ignition and establishment of combustion and run-up of a gas turbine to operational, synchronous speed. The Gas Turbine may be operated as an individual unit on open cycle or as a component of a combined cycle plant consisting of a gas turbine, heat recovery steam generator and steam turbine.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit may require a licence to practise in the workplace in some States or Territories. There may also be additional assessment activities required by regulatory authorities for the issue of the licence to practise.

However, practice in this unit is subject to regulations directly related to Occupational Health and Safety.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 4 Writing 4 Numeracy 4

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the

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Evidence Guide.

Elements and Performance Criteria

ELEMENT		PERFORMANCE CRITERIA	
1	Plan and prepare work	1.1	Safety issues are identified to comply with enterprise/site requirements
		1.2	Work requirements are identified from relevant personnel and documentation
		1.3	Pre operational checks are carried out on plant according to manufacturer's recommendations and site requirements
		1.4	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2	Start and run up gas turbine	2.1	Pre-operational conditions are established in accordance with enterprise standards and site requirements
		2.2	Where the gas turbine is a component of a combined cycle unit pre-operational conditions of the Heat Recovery Steam Generator, associated steam mains and Steam Turbine are established in accordance with enterprise standards and site requirements.
		2.3	Starting procedures are commenced and correct purge, ignition and run-up sequence observed
		2.4	Minimum operation of gas turbine is established and supported in accordance with enterprise, manufacturer's and site requirements.
		2.5	Where the gas turbine is a component of a combined cycle unit monitoring and control of Heat Recovery Steam Generator drum level, feedwater flow, steam and metal temperature rates of rise, steam pressure rate of rise, steam flow and drainage are carried out in accordance with manufacturer's and site requirements

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ELEMENT		PERFORMANCE CRITERIA	
		2.6	Gas Turbine exhaust gas temperature and flow to the Heat Recovery Steam Generator and Gas Turbine power output are monitored and adjusted to achieve required steam conditions and demand, observing operating requirements
		2.8	Plant is operated within limits of plant design, enterprise or site requirements.
		2.9	Plant is monitored and observed to detect deviations from required operating conditions.
		2.10	Corrective action is taken to rectify abnormalities in accordance with manufacturer's and enterprise/site procedures
3	Test plant operation	3.1	Tests are performed in accordance with defined procedures applicable to the operational test
		3.2	System and plant is observed for correct operational response
		3.3	Corrective action is taken when response is not in accordance with documentation, plant integrity or personnel safety requirements
		3.4	Plant is returned to required operational status upon completion of test
4	Identify and respond to plant operation anomalies	4.1	Cause/s of abnormal plant operating conditions are identified by analysing the technical and operational information in a logical and sequential manner
		4.2	Corrective action taken is in accordance with enterprise/site procedures
		4.3	Plant integrity and personnel safety is maintained through consultation with appropriate personnel, and reference to plant, technical and operational documentation
		4.4	Appropriate personnel are notified when defects are detected
5	Complete documentation	5.1	Documentation is updated and plant problems, movements, abnormalities and status are

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ELEMENT	PERFORMANCE CRITERIA
	reported and logged in accordance with enterprise/site procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired starting and running up a gas turbine.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO 407B Start and run up A gas turbine

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant environmental, occupational health and safety legislation and regulations
- Enterprise procedures
- Plant drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Relevant plant and equipment, its location and operating parameters
- Electric motor types and characteristics
- Pump and compressor types and characteristics
- Valve, damper and actuator types and characteristics
- Switchgear types and characteristics
- Electrical protection types and characteristics
- Electrical principles
- a.c. generators types and characteristics
- Transformers types and characteristics
- Generator excitation and cooling systems, types and characteristics
- Relevant state and territory regulations
- Gas turbine principle of operation
- Air intake, types and characteristics
- Air inlet cooling and heating systems, types and characteristics
- Exhaust, types and characteristics
- Lubrication systems, types and characteristics

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REQUIRED SKILLS AND KNOWLEDGE

- Control oil systems, types and characteristics
- Cooling systems, types and characteristics
- Water/steam injection systems, types and characteristics
- Combustion system, types and characteristics
- Control and data acquisition systems;
- Computers and software
- Mechanical and electrical supervisory, alarm, protection and control equipment
- The principles of safe and efficient fuel combustion
- Fuel storage, conditioning, transfer and firing equipment types and characteristics
- The objectives, sequence of operations, critical operating parameters and safety precautions associated with a gas turbine start up;
- Gas turbine efficiency
- a.c. and d.c. electrical distribution systems;
- Station water distribution systems;
- Fire protection control systems; compressed air systems; auxiliary supply systems.

T2 Specific skills needed to achieve the Performance Criteria:

- Interpret plant drawings and manufacturers manuals
- Apply relevant state and territory regulations
- Apply enterprise recording procedures
- Communicate effectively
- Plan and prioritise work; organise resources
- Identify plant status
- Prepare plant/equipment for operation
- Use relevant hand tools
- Operate gas turbine and associated plant and equipment
- Apply diagnostic and testing techniques
- Identify and respond to abnormal plant operating conditions
- Apply data analysis techniques and tools

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

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Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be ‘rich’ in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its ‘richness’. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit **9.2)**

Before the critical aspects of evidence are considered all

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pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement OHS workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti-Discrimination legislation, regulations, polices and workplace procedure
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The knowledge and application of relevant sections of occupational, health and safety legislation; statutory legislation; enterprise/site safety procedures; enterprise/site standard operating procedures and safe operating principles; enterprise/site emergency procedures
  - The knowledge of principles and techniques of operation of a gas turbine and associated plant and equipment
  - The knowledge of operational testing of plant
  - The knowledge of system components and the manner in which these components interact with other plant and equipment
  - The knowledge of the principles of fuel combustion and emission control
  - The knowledge of the principles of heat recovery steam generator and feedwater sampling and chemical treatment
  - The ability to prepare and plan work
  - The ability to prepare plant/equipment for operation
  - The ability to monitor and operate plant/equipment in accordance with enterprise/site standard operating procedures and safe operating principles
  - The ability to analyse plant faults

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- Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment **9.3)**

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working in limited spaces with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

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Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

UEPOPS336B Operate and monitor a gas turbine unit

UEPOPS333B Operate and monitor HRSG hot gas control system

UEPOPS433B Start up a heat recovery steam generator unit\

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole, providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Plant and equipment may include: gas turbines; gas turbine emission control equipment; gas turbine exhaust gas control dampers; heat recovery steam generators and auxiliary plant; heat recovery steam generator supplementary duct firing equipment; fuel and fuel delivery systems; fuel management systems; flame detection equipment; steam temperature control equipment; a.c. and d.c. electrical distribution systems; electrical switchgear; electric motors; electric motor driven pumps and fans; diesel engine driven auxiliary plant; station water distribution systems; hydraulic power oil systems; compressed air systems; distributed control systems; supervisory, protection, alarm and control equipment.

Safety standards may include relevant sections of Occupational Health and Safety legislation, enterprise safety rules, relevant State and federal legislation, national standards for plant and Australian standards.

Information and documentation sources may include verbal or written communications; enterprise safety rules documentation; enterprise operating instructions; computer-based and computer accessed documentation; enterprise/site standing and operating instructions; enterprise log books; manufacturer’s operation and maintenance manuals; and equipment and alarm manuals.

Technical and operational indicators may include stimuli (auditory, olfactory, tactile, visual), local indicators and recorders, computers and alarms (visible and/or audible).

Communications may be by direct personal interaction or by means of telephone, verbal or text-based telephone messaging, two way radio, pager, computer (electronic

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RANGE STATEMENT

mail) and/or operating logs (written or verbal).

Appropriate personnel for consultation, giving or receiving direction may include: supervisor/team leader or equivalent, power plant operations personnel or equivalent, technical and engineering officers or equivalent, maintenance staff, other operating staff or equivalent, system controller/network controller, field operator, restricted H.V. operators, independent generators and customers and contractor staff.

Operating environment may be remote from the plant and equipment being operated, (in cases where operation is assisted by remote indication of operating parameters and plant status), during inclement or otherwise harsh weather conditions, in hot/wet/noisy/dusty/elevated/confined or enclosed areas or during night periods.

Plant operations (systems requirements) may include:

Returns to service with the heat recovery steam generator in a cold, warm or hot condition; compressor on-load or off load blade washing; operational testing.

Operational tests may include:

Loss of a major auxiliary control response checks; stand-by plant “cut-in” tests; dampers/valves operating checks, gas turbine run back tests and pre and post start tests.

Faults and abnormal operating conditions may include:

Failure of starting device; excessively high exhaust temperature, excessive blade path temperature spread, excessively high wheel space temperature, excessively high compartment temperatures, excessively high shaft or bearing vibration, excessively high speed (or frequency, when synchronised); reduction in flow or failure of fuel supply; uneven fuel distribution to combustors; loss of a major auxiliary; loss of electrical supply to switchboards, drive motors or valve actuators; automatic control loop(s) malfunctions; high temperatures on/in: motor and/or pump bearings, lubricating oil or motor windings; heat exchange element tube leaks; excessively high heating/cooling rates; high differential pressures on fuel/oil/air filters and strainers; failed field devices; failed/malfunctioning actuators/dampers/valves.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

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Competency Field

Competency Field **11)**

Operations

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UEPOPS408B Shut down a gas turbine

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to shut down a gas turbine unit to a standby state. The Gas Turbine may be operated as an individual unit on open cycle or as a component of a combined cycle plant consisting of a gas turbine, heat recovery steam generator and steam turbine.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit may require a licence to practise in the workplace in some States or Territories. There may also be additional assessment activities required by regulatory authorities for the issue of the licence to practise.

However, practice in this unit is subject to regulations directly related to Occupational Health and Safety.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 4 Writing 4 Numeracy 4

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the

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Evidence Guide.

Elements and Performance Criteria

ELEMENT		PERFORMANCE CRITERIA	
1	Plan and prepare work	1.1	Safety issues are identified to comply with enterprise/site requirements
		1.2	Work requirements are identified from relevant personnel and documentation
		1.3	Operational checks are carried out on plant according to manufacturer's recommendations and site requirements
		1.4	Where appropriate, the teams and individuals roles and responsibilities within the team are identified
		1.5	Where required, assistance is given in the provision of the on-the-job training.
2	Shut down a gas turbine	2.1	Gas turbine is unloaded and shut down according to manufacturer's/enterprise requirements
		2.2	Where the gas turbine is a component of a combined cycle unit, the gas turbine exhaust gas flow and power output are adjusted to achieve required steam flow and conditions, observing operating requirements.
		2.3	Gas turbine and associated plant is placed in a safe condition in accordance with manufacturer's/enterprise requirements
		2.4	Plant is operated within limits of plant design, enterprise or site requirements
		2.5	Plant is monitored and observed to detect deviations from required operating conditions
		2.6	Corrective actions are taken to rectify abnormalities in accordance with manufacturer's and enterprise/site procedures

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ELEMENT	PERFORMANCE CRITERIA	
3 Test plant operation	3.1	Tests are performed in accordance with defined procedures applicable to the operational test
	3.2	System and plant is observed for correct operational response
	3.3	Corrective action is taken when response is not in accordance with documentation, plant integrity or personnel safety requirements
	3.4	Plant is returned to required operational status upon completion of test
4 Analyse system faults	4.1	Causes of abnormal plant operating conditions are identified by analysing the technical and operational information in a logical and sequential manner
	4.2	Corrective action taken is in accordance with enterprise/site procedures
	4.3	Plant integrity and personnel safety is maintained through consultation with appropriate personnel, and reference to plant, technical and operational documentation
	4.4	Appropriate personnel are notified when defects are detected
5 Complete documentation	5.1	Documentation is updated and plant problems, movements, abnormalities and status are reported and logged in accordance with enterprise/site procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired in shutting down a gas turbine.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

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REQUIRED SKILLS AND KNOWLEDGE

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO408B Shut down a gas turbine

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant environmental, occupational health and safety legislation and regulations
- Enterprise procedures
- Plant drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Relevant plant and equipment, its location and operating parameters
- Electric motor types and characteristics
- Pump and compressor types and characteristics
- Valve, damper and actuator types and characteristics
- Switchgear types and characteristics
- Electrical protection types and characteristics
- Electrical principles
- a.c. generators types and characteristics
- Transformers types and characteristics
- Generator excitation and cooling systems, types and characteristics
- Relevant state and territory regulations
- Gas turbine principle of operation
- Air intake, types and characteristics
- Air inlet cooling and heating systems, types and characteristics
- Exhaust, types and characteristics
- Lubrication systems, types and characteristics
- Control oil systems, types and characteristics
- Cooling systems, types and characteristics
- Water/steam injection systems, types and characteristics
- Combustion system, types and characteristics
- Generator, types and characteristics
- Generator excitation system, types and characteristics
- Enterprise recording procedures;
- Control and data acquisition systems; computers and software
- Mechanical and electrical supervisory, alarm, protection and control equipment
- The principles of safe and efficient fuel combustion
- Fuel storage, conditioning, transfer and firing equipment types and characteristics
- The objectives, sequence of operations, critical operating parameters and safety precautions associated with a gas turbine shut down
- a.c. and d.c. electrical distribution systems;
- Station water distribution systems;

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REQUIRED SKILLS AND KNOWLEDGE

- Fire protection control systems

T2 Specific skills needed to achieve the Performance Criteria:

- Interpret plant drawings and manufacturers manuals
- Apply relevant state and territory regulations
- Apply enterprise recording procedures
- Communicate effectively
- Plan and prioritise work
- Organise resources
- Identify plant status; prepare plant/equipment for operation
- Use relevant hand tools
- Operate gas turbine and associated plant and equipment
- Apply diagnostic and testing techniques
- Identify and respond to abnormal plant operating conditions
- Apply data analysis techniques and tools

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and

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regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as

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specified in the Performance Criteria and Range Statement
- Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
- Demonstrate an appropriate level of employability skills
- Conduct work observing the relevant Anti-Discrimination legislation, regulations, polices and workplace procedure

- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The knowledge and application of relevant sections of occupational, health and safety legislation; statutory legislation; enterprise/site safety procedures; enterprise/site standard operating procedures and safe operating principles; enterprise/site emergency procedures
  - The knowledge of principles and techniques of operation of a gas turbine and associated plant and equipment
  - The knowledge of operational testing of plant
  - The knowledge of system components and the manner in which these components interact with other plant and equipment
  - The knowledge of the principles of fuel combustion and emission control
  - The knowledge of the principles of heat recovery steam generator and feedwater sampling and chemical treatment
  - The ability to prepare and plan work
  - The ability to prepare plant/equipment for operation
  - The ability to monitor and operate plant/equipment in accordance with enterprise/site standard operating procedures and safe operating principles
  - The ability to analyse plant faults
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

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- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working in limited spaces with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

UEPOPS336B Operate and monitor a gas turbine unit

UEPOPS333B Operate and monitor HRSG hot gas control system

UEPOPS433B Start up a heat recovery steam generator unit

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Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole, providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Plant and equipment may include: gas turbines; gas turbine emission control equipment; gas turbine exhaust gas control dampers; heat recovery steam generators and auxiliary plant; heat recovery steam generator supplementary duct firing equipment; fuel and fuel delivery systems; fuel management systems; flame detection equipment; steam temperature control equipment; a.c. and d.c. electrical distribution systems; electrical switchgear; electric motors; electric motor driven pumps and fans; diesel engine driven auxiliary plant; station water distribution systems; hydraulic power oil systems; compressed air systems; distributed control systems; supervisory, protection, alarm and control equipment.

Safety standards may include relevant sections of Occupational Health and Safety legislation, enterprise safety rules, relevant State and federal legislation, national standards for plant and Australian standards.

Information and documentation sources may include verbal or written communications; enterprise safety rules documentation; enterprise operating instructions; computer-based and computer accessed documentation; enterprise/site standing and operating instructions; enterprise log books; manufacturer’s operation and maintenance manuals; and equipment and alarm manuals.

Technical and operational indicators may include stimuli (auditory, olfactory, tactile, visual), local indicators and recorders, computers and alarms (visible and/or audible).

Communications may be by direct personal interaction or by means of telephone, verbal or text-based telephone messaging, two way radio, pager, computer (electronic mail) and/or operating logs (written or verbal).

Appropriate personnel for consultation, giving or receiving direction may include: supervisor/team leader or equivalent, power plant operations personnel or equivalent, technical and engineering officers or equivalent, maintenance staff, other operating staff or equivalent, system controller/network controller, field operator, restricted H.V. operators, independent generators and customers and contractor staff.

Operating environment may be remote from the plant and equipment being operated, (in cases where operation is assisted by remote indication of operating parameters and plant status), during inclement or otherwise harsh weather conditions, in hot/wet/noisy/dusty/elevated/confined or enclosed areas or during night periods.

Plant operations (systems requirements) may include:

Returns to service with the heat recovery steam generator in a cold, warm or hot condition, compressor on-load or off load blade washing, operational testing.

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RANGE STATEMENT

Operational tests may include:

Loss of a major auxiliary control response checks; stand-by plant “cut-in” tests; dampers/valves operating checks and pre and post start tests

Faults and abnormal operating conditions may include:

Failure of starting device; excessively high exhaust temperature, excessive blade path temperature spread, excessively high wheel space temperature, excessively high compartment temperatures, excessively high shaft or bearing vibration, excessively high speed (or frequency, when synchronised); reduction in flow or failure of fuel supply; uneven fuel distribution to combustors; loss of a major auxiliary; loss of electrical supply to switchboards, drive motors or valve actuators; automatic control loop(s) malfunctions; high temperatures on/in: motor and/or pump bearings, lubricating oil or motor windings; heat exchange element tube leaks; excessively high heating/cooling rates; high differential pressures on fuel/oil/air filters and strainers; failed field devices; failed/malfunctioning actuators/dampers/valves.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations

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UEPOPS409B Start up a boiler unit

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to establish combustion in a boiler through to a stage at which combustion support energy is no longer necessary.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit may require a licence to practise in the workplace in some States or Territories. There may also be additional assessment activities required by regulatory authorities for the issue of the licence to practise.

However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 4 Writing 4 Numeracy 4

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the

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Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Plan and prepare work	1.1	Safety issues are identified to comply with enterprise/site requirements
	1.2	Work requirements are identified from relevant personnel and documentation
	1.3	Pre operational checks are carried out on plant according to manufacturer's recommendations and site requirements
	1.4	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2 Start up boiler unit	2.1	Boiler auxiliary systems are started up and/or made available to support boiler start up in accordance with manufacturer's and enterprise/site procedures
	2.1	Pre-light conditions are established in accordance with enterprise standards and site requirements
	2.2	Combustion is established and supported in accordance with enterprise, manufacturer's and site requirements. Combustion support fuel consumption is kept at minimum levels
	2.3	Fuel and air and feed water flows are adjusted to achieve required steam conditions and demand , observing operating requirements
	2.4	Plant is operated within limits of plant design, enterprise or site requirements
	2.5	Plant is monitored and observed to detect deviations from required operating conditions
	2.6	Corrective actions are taken to rectify abnormalities in accordance with manufacturer's

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ELEMENT		PERFORMANCE CRITERIA	
			and enterprise/site procedures
3	Test plant operation	3.1	Tests are performed in accordance with defined procedures applicable to the operational test
		3.2	System and plant is observed for correct operational response
		3.3	Corrective action is taken when response is not in accordance with documentation, plant integrity or personnel safety requirements
		3.4	Plant is returned to required operational status upon completion of test
4	Analyse system faults	4.1	Causes of abnormal plant operating conditions are identified by analysing the technical and operational information in a logical and sequential manner
		4.2	Corrective action taken is in accordance with enterprise/site procedures
		4.3	Plant integrity and personnel safety is maintained through consultation with appropriate personnel, and reference to plant, technical and operational documentation
		4.4	Appropriate personnel are notified when defects are detected
5	Complete documentation	5.1	Documentation is updated and plant problems, movements, abnormalities and status are reported and logged in accordance with enterprise/site procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired starting up a boiler unit.

All knowledge and skills detailed in this unit should be contextualised to current

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REQUIRED SKILLS AND KNOWLEDGE

industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO409B Start up a boiler unit

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant environmental, occupational health and safety legislation and regulations
- Enterprise procedures
- Plant drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Relevant plant and equipment, its location and operating parameters
- Electric motor types and characteristics
- Pump and compressor types and characteristics
- Valve, damper and actuator types and characteristics
- Switchgear types and characteristics
- Electrical protection types and characteristics
- Electrical principles
- Process control principles
- Boiler process control systems
- Fan types and characteristics
- Transformers types and characteristics
- Relevant state and territory regulations
- Plant status
- Enterprise recording procedures
- Control and data acquisition systems
- Supervisory, alarm, protection and control equipment
- The system components and their interaction with other plant and equipment external to that covered by this competency
- Temperature and pressure raising techniques and principles
- Principles of air heater operation
- Principles of relevant fuel combustion
- Electricity distribution system, a.c. and d.c.
- Station water distribution systems
- Fire protection control systems
- Principles of boiler and feedwater chemical treatment
- Boiler temperature and pressure requirements
- Thermodynamics
- Properties of matter
- Coal handling plant
- Bunkering

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REQUIRED SKILLS AND KNOWLEDGE

- Steam power plant boiler water and steam systems
- Boiler draught system, types and characteristics
- Fuel types and properties
- Principles governing efficient combustion
- Fuel conditioning and fuel firing equipment
- Control of a boiler start up
- Boiler efficiency
- Auxiliary supply systems
- Safe operating principles

T2 Specific skills needed to achieve the Performance Criteria:

- Apply relevant environmental, occupational health and safety legislation and regulations
- Apply enterprise procedures
- Interpret plant drawings and manufacturers manuals
- Apply relevant state and territory regulations
- Apply enterprise recording procedures
- Identify plant status
- Prepare plant/equipment for operation
- Organise resources
- Operate boiler plant and equipment
- Apply temperature and pressure raising techniques and principles
- Apply diagnostic and testing techniques
- Identify and respond to abnormal plant operating conditions
- Plan and prioritise work
- Use relevant hand tools
- Communicate effectively
- Apply data analysis techniques and tools

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and mustand must be read in conjunction with the Performance Criteria and the Range Statement of the unit and theand the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

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Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be ‘rich’ in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its ‘richness’. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit **9.2)**

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered

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holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti-Discrimination legislation, regulations, polices and workplace procedure
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - The preparation and planning of work
  - The operation of boiler plant and equipment
  - Operationally testing plant
  - Analysing plant faults
  - The system components and interaction with other plant and equipment
  - The temperature and pressure raising requirements
  - The ability to prepare plant/equipment for operation
  - The principles of relevant fuel combustion
  - The principles of boiler and feedwater chemical treatment
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

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Context of and specific resources for assessment **9.3)**

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working in limited spaces with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

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There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole, providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Plant and equipment may include boiler and auxiliary plant; fuel and fuel delivery system plant; fuel management system; flame detection equipment; steam temperature control plant; boiler heating surfaces dust removal system; combustion waste extraction system; electric motor; electricity distribution system a.c. and d.c.; diesel engine driven auxiliary plant; station water distribution systems; hydraulic power oil system; compressed air systems; computers with equipment control functions; and supervisory, protection, alarm and control equipment.

Safety standards may include relevant sections of Occupational Health and Safety legislation, enterprise safety rules, relevant State and federal legislation, national standards for plant and Australian standards.

Information and documentation sources may include verbal or written communications; enterprise safety rules documentation; enterprise operating instructions; dedicated computer equipment; enterprise/site standing instructions and plant notes; enterprise log books; manufacturer’s operation and maintenance manuals; and equipment and alarm manuals.

Technical and operational indicators may include stimuli (audio, smell, touch, visual), remote or local indicators and recorders, computers and alarms (visible and or audible).

Communications may be by means of telephone, two way radio, pager, computer (electronic mail) and operating logs (written or verbal).

Tests may include loss of major auxiliary controls response checks, stand-by plant “cut-in” tests, dampers/valves operating checks and pre and post start tests.

Appropriate personnel to consult, give or receive direction may include supervisor/team leader or equivalent; other coordinators of energy production or equivalent; technical and engineering officers or equivalent; maintenance staff; other operating staff; and contractor staff.

Operating environment may be remote from plant and equipment being operated; (operation is assisted by remote indicators of plant status and other parameters

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RANGE STATEMENT

monitored); during inclement or otherwise harsh weather conditions, in wet/noisy/dusty/hot areas or during continuous operation.

Plant operations (systems requirements) may include cold/hot, start return to service; boiler chemical clean; and raising pressure for safety valve setting.

Faults and abnormal operating conditions may include loss of a major auxiliary; loss of electrical supply to switchboard(s), motors; boiler water chemical operating limits exceeded; automatic control loop(s) malfunctions; boiler heating surfaces dust removal system malfunctions; high temperatures on/in, boiler heating surfaces/tubes/headers, boiler exhaust (back end), steam to turbine, ex superheater or reheater, motor, fan, pump bearings and lubricating oil, motor windings; boiler tube leaks; air heater cold end temperatures low; air heater/combustion air ductwork fires; fuel preparation and delivery systems fires; fuel system malfunction; excessive drum water level split; excessively high heating/cooling rates; high/low furnace dp; high dp's on oil/air filters and strainers; failed field devices; failed/malfunctioning actuators/dampers/valves; boiler feedwater pumps malfunctions; and boiler protection operation.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations

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UEPOPS410B Shut down a boiler unit

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to conduct the shutdown of a boiler unit to a de-pressurised state.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit may require a licence to practise in the workplace in some States or Territories. There may also be additional assessment activities required by regulatory authorities for the issue of the licence to practise.

However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 4 Writing 4 Numeracy 4

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the

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Evidence Guide.

Elements and Performance Criteria

ELEMENT		PERFORMANCE CRITERIA	
1	Plan and prepare work	1.1	Safety issues are identified to comply with enterprise/site requirements
		1.2	Work requirements are identified from relevant personnel and documentation
		1.3	Pre-operational checks are carried out on plant according to manufacturer's recommendations and site requirements
		1.4	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2	Shut down boiler unit	2.1	Shut down boiler unit in accordance with manufacturer's and enterprise/site procedures.
		2.2	Cool down and purge boiler unit in accordance with manufacturer's and enterprise/site procedures
		2.3	De-pressurised boiler unit in accordance with manufacturer's and enterprise/site procedures
		2.4	Corrective actions are taken to rectify abnormalities in accordance with manufacturer's and enterprise/site procedures
3	Test plant operation	3.1	Tests are performed in accordance with defined procedures applicable to the operational test
		3.2	System and plant is observed for correct operational response
		3.3	Corrective action is taken when response is not in accordance with documentation, plant integrity or personnel safety requirements
		3.4	Plant is returned to required operational status upon completion of test

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ELEMENT	PERFORMANCE CRITERIA	
4 Analyse system faults	4.1	Causes of abnormal plant operating conditions are identified by analysing the technical and operational information in a logical and sequential manner
	4.2	Corrective action taken is in accordance with enterprise/site procedures
	4.3	Plant integrity and personnel safety is maintained through consultation with appropriate personnel, and reference to plant, technical and operational documentation
	4.4	Appropriate personnel are notified when defects are detected
5 Complete documentation	5.1	Documentation is updated and plant problems, movements, abnormalities and status are reported and logged in accordance with enterprise/site procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired shutting down a boiler units.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO410B - Shut down a boiler unit

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant environmental, occupational health and safety legislation and regulations
- Enterprise procedures
- Plant drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Relevant plant and equipment, its location and operating parameters

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REQUIRED SKILLS AND KNOWLEDGE

- Electric motor types and characteristics
- Pump and compressor types and characteristics
- Valve, damper and actuator types and characteristics
- Switchgear types and characteristics
- Electrical protection types and characteristics
- Electrical principles
- Process control principles
- Boiler process control systems
- Fan types and characteristics
- Transformers types and characteristics
- Relevant state and territory regulations
- Plant status;
- Enterprise recording procedures;
- Control and data acquisition systems;
- Supervisory, alarm, protection and control equipment;
- Shutting down and depressurising a boiler;
- The system components and interaction;
- Principles of air heater operation;
- Principles of fuel combustion;
- Electricity distribution system, a.c. and d.c.;
- Station water distribution systems;
- Fire protection control systems;
- Principles of boiler and feedwater chemical treatment;
- Thermodynamics;
- Properties of matter;
- Lubrication and bearings;
- Steam power plant boiler water and steam systems;
- Boiler draught system, types and characteristics
- Fuel types and properties
- Fuel conditioning and fuel firing equipment;
- Control of a boiler shut down;
- Auxiliary supply systems;

T2 Specific skills needed to achieve the Performance Criteria:

- Apply relevant environmental, occupational health and safety legislation and regulations
- Apply enterprise procedures
- Interpret plant drawings and manufacturers manuals
- Apply relevant state and territory regulations
- Apply enterprise recording procedures;
- Identify plant status;

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REQUIRED SKILLS AND KNOWLEDGE

- Prepare plant/equipment for operation;
- Organise resources;
- Shut down boiler plant and equipment;
- Apply cooling and de-pressurising techniques and principles;
- Apply diagnostic and testing techniques;
- Identify and respond to abnormal plant operating conditions;
- Plan and prioritise work;
- Use relevant hand tools;
- Communicate effectively ;
- Apply data analysis techniques and tools;

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place,

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access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit

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- Demonstrate an appropriate level of employability skills
- Conduct work observing the relevant Anti-Discrimination legislation, regulations, polices and workplace procedure

- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - The preparation and planning of work
  - The operation of boiler plant and equipment
  - Operationally testing plan
  - Analysing plant faults
  - Monitoring plant operation
  - The knowledge of the system components and their interaction
  - The knowledge of boiler operational processes
  - The knowledge of cooling and de-pressurising techniques
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working in limited spaces with

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different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment

9.4)

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole, providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Plant and equipment may include boiler and auxiliary plant; fuel and fuel delivery system plant; fuel management system; flame detection equipment; steam temperature control plant; boiler heating surfaces dust removal system; combustion waste extraction system; electric motors (a.c. and d.c., high and low voltage); electricity distribution system (a.c. and d.c. transformers); diesel engine driven auxiliary plant;

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RANGE STATEMENT

station water distribution systems; hydraulic power oil system; compressed air systems; computers with equipment control functions; and supervisory, alarm and control equipment.

Safety standards may include relevant sections of Occupational Health and Safety legislation, enterprise safety rules, Australian standards, national standards for plant and relevant State and federal legislation.

Information and documentation sources may include verbal or written communications; enterprise safety rules documentation; enterprise operating instructions; manufacturer's operational and maintenance manuals; equipment and alarm manuals, enterprise log books, dedicated computer equipment, enterprise standing instructions and plant notes.

Technical and operational indicators may include stimuli (audio, smell, touch, visual), remote or local indicators and recorders, computers and alarms (visible and/or audible).

Communications may be by means of telephone, two way radio, pager, computer (electronic mail) and operating log (written or verbal).

Tests may include loss of a major auxiliary controls response checks, stand-by plant "cut-in" tests, dampers/valves operating checks and pre and post shut-down tests.

Appropriate personnel to consult, give or receive direction may include supervisor/team leader or equivalent; other coordinators of energy production or equivalent; technical and engineering officers or equivalent; maintenance staff; other operating staff and contractor staff.

Operating environment may be remote from plant and equipment being operated (operation is assisted by remote indicators of plant status and other parameters monitored); in wet/noisy/dusty/hot areas, during night periods and during inclement or otherwise harsh weather conditions.

Plant operations (systems requirements) may include boiler emergency trip; boiler shutdown, with or without turbine bypass or by using forced cooling procedures.

Faults and abnormal operating conditions may include boiler trip; loss of a major auxiliary; loss of electrical supply to switchboard(s), motors; boiler water chemical operating limits exceeded; automatic control loop(s) malfunctions; boiler heating surfaces dust removal system malfunctions; high temperatures on/in, boiler heating surfaces/tubes/headers, boiler exhaust (back end), steam to turbine, motor, fan, pump bearings and lubricating oil, motor windings; boiler tube leaks; air heater cold end temperatures low; air heater/combustion air ductwork fires; fuel preparation and delivery systems fires; fuel system malfunction; excessive drum water level split; excessively high heating/cooling rates; high/low furnace dp; high dp's on oil/air filters and strainers; failed field devices (pressure/level switches/transmitters, thermocouples); failed/ malfunctioning actuators/dampers/valves; boiler feedwater pumps malfunctions and boiler protection.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The

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RANGE STATEMENT

definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations

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UEPOPS411B Run up a steam turbine

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to conduct a steam turbine run up to a stable operating condition.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit may require a licence to practise in the workplace in some States or Territories. There may also be additional assessment activities required by regulatory authorities for the issue of the licence to practise.

Practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 4 Writing 4 Numeracy 4

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the

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Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Plan and prepare work	1.1	Safety issues are identified to comply with enterprise/site requirements
	1.2	Work requirements are identified from relevant personnel and documentation
	1.3	Pre-operational checks are carried out on plant according to manufacturer's recommendations and site requirements
	1.4	The turbine running up and loading schedule are ascertained from relevant documentation and in accordance with enterprise/site requirements
	1.5	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training.
2 Run up steam turbine	2.1	Steam turbine and generator auxiliary systems are started up and/or made available to support turbine run up in accordance with manufacturer's and enterprise/site procedures
	2.2	Steam turbine is run-up in accordance with manufacturer's and enterprise/site procedures Plant is monitored and observed to detect deviations from normal operating conditions
	2.3	Steam Turbine is monitored and observed to detect deviations from normal run up operating conditions Corrective actions are taken to rectify abnormalities in accordance with manufacturer's and enterprise/site procedures Generator is synchronised and connected to the electrical system in accordance with enterprise and manufacturer operating procedures

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ELEMENT	PERFORMANCE CRITERIA	
3 Test plant operation	3.1	Tests are performed in accordance with defined procedures applicable to the operational test
	3.2	System and plant are observed for correct operational response
	3.3	Corrective action is taken when response is not in accordance with documentation, plant integrity or personnel safety requirements
	3.4	Plant is returned to required operational status upon completion of test
4 Analyse system faults	4.1	Causes of abnormal plant operating conditions are identified by analysing the technical and operational information in a logical and sequential manner
	4.2	Corrective action taken is in accordance with enterprise/site procedures
	4.3	Plant integrity and personnel safety is maintained through consultation with appropriate personnel, and reference to plant, technical and operational documentation
	4.4	Appropriate personnel are notified when defects are detected
5 Complete documentation	5.1	Documentation is updated and plant problems, movements, abnormalities and status are reported and logged in accordance with enterprise/site procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

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REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired running up a steam turbine.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO411B Run up a steam turbine

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant environmental, occupational health and safety legislation and regulations
- Enterprise procedures
- Plant drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Relevant plant and equipment, its location and operating parameters
- Electric motor types and characteristics
- Pump and compressor types and characteristics
- Valve, damper and actuator types and characteristics
- Switchgear types and characteristics
- Electrical protection types and characteristics
- Electrical principles
- a.c. generators types and characteristics
- Transformers types and characteristics
- Generator excitation and cooling systems, types and characteristics
- Relevant state and territory regulations
- Plant status
- Enterprise recording procedures
- Control and data acquisition systems
- Supervisory, alarm, protection and control equipment
- Turbine speed control equipment
- Heat transfer principles
- The system components and interaction
- Electricity distribution system, a.c. and d.c.
- The system components and their interaction with other plant and equipment external to that covered by this competency
- Station water distribution systems
- Fire protection control systems
- Power and control oil systems, types and characteristics
- Compressed air systems, types and characteristics
- Turbine life expenditure and control
- Turbine bypass system types and characteristics
- Vacuum raising and turbine gland sealing systems;
- Thermodynamics
- Properties of matter
- Lubrication and bearings

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Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be ‘rich’ in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its ‘richness’. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and

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developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement OHS workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti-Discrimination legislation, regulations, polices and workplace procedure
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - The preparation and planning of work
  - The operation of turbine plant and equipment
  - Operationally testing plant
  - Analysing plant faults

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- The knowledge of the system components and their interaction
- The knowledge of turbine operational processes
- The knowledge of turbine supervision and control systems
- The knowledge of heat transfer principles
- Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working in limited spaces with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment

9.4)

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are

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assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole, providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Plant and equipment may include turbine and auxiliary plant; turbine lubrication and power/control oil systems; turbine by-pass system plant; condensate and feedwater system plant; condensate polishing plant; high and low pressure heating systems; steam condensing and cooling systems; condenser vacuum raising equipment; turbine glad sealing equipment; cooling water systems plant; boiler feedwater de-aerating equipment; condensate and feedwater chemical treatment equipment; electric motors a.c. and d.c.; electricity distribution systems a.c. and d.c.; diesel engine drive auxiliary plant; station water distribution systems; hydraulic oil system; pumps; compressed air systems; computers with equipment control functions; supervisory, alarm and control equipment; and diesel engine drive auxiliary plant.

Safety standards may include relevant sections of Occupational Health and Safety legislation, enterprise safety rules, Australian standards, national standards for plant and relevant State and federal legislation.

Information and documentation sources may include verbal or written communications; enterprise safety rules documentation; enterprise operating instructions; manufacturer’s operational and maintenance manuals; equipment and alarm manuals, enterprise log books, dedicated computer equipment, enterprise standing instructions and plant notes; enterprise standing instructions and plant notes.

Technical and operational indicators may include stimuli (audio, smell, touch, visual),

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RANGE STATEMENT

remote or local indicators and recorders, computers and alarms (visible and or audible).

Communications may be by means of telephone, two way radio, pager, computer (electronic mail) and operating log (written or verbal).

Tests may include loss of major auxiliary controls response checks, stand-by plant "cut-in" tests, valves operating checks, turbine valve and emergency governor operation test, pre-start tests, performance tests, heater leak checks and alarm and protection tests.

Appropriate personnel to consult, give or receive direction may include supervisor/team leader or equivalent; other coordinators of energy production or equivalent; technical and engineering officers or equivalent; maintenance staff; other operating staff and contractor staff.

Operating environment may be remote from plant and equipment being operated; where operation is assisted by remote indicators of plant status and other parameters monitored; in wet/noisy/dusty/hot areas, during night periods; and during inclement or otherwise harsh weather conditions.

Unit operations (systems requirements) may include cold start return to service; warm start return to service with or without turbine bypass; and hot restart return to service, with or without turbine bypass.

Faults and abnormal operating conditions may include loss of a major auxiliary; loss of electrical supply to auxiliaries (a.c. or d.c.); turbine water ingress; excessively high turbine and turbine valves heating/cooling rates/differentials; high condenser vacuum; condenser tube leak; high dissolved oxygen, conductivity; high turbine bearing temperatures/vibration; high/low bearing oil temperature; loss of turbine bearing oil flow/pressure; low/high pressure heaters malfunctions; turbine bypass system malfunction; actuator/valve mechanical/ electrical faults/failure; failed field devices; and turbine protection.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field 11)

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Competency Field **11)**

Operations

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UEPOPS412B Undertake commissioning-decommissioning

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This competency standard unit deals with the skills and knowledge required to undertake commissioning / decommissioning of plant and equipment.

Commissioning / decommissioning refers to work of a significant nature where plant / equipment is required to meet manufacturer's performance specifications It may also include the commissioning and decommissioning of plant and equipment following overhaul or major refurbishment.

It does not cover the removing or returning plant to service under normal / routine maintenance situations.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where

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License to practice **3)**

applicable contracts of training such as apprenticeships and the like.

Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 4 Writing 4 Numeracy 4

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

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Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and prepare for the work	1.1 Work requirements are identified from request/work orders or equivalent and clarified/confirmed with appropriate parties or by site inspection
	1.2 Occupational Health and Safety standards, statutory requirements, relevant Australian standards, codes of practice, manufacturers' specifications, environmental requirements and enterprise procedures are identified, applied and monitored throughout the work procedure
	1.3 Resources required to satisfy the work plan are identified, obtained and inspected for compliance with the job specifications
	1.4 Relevant plans, drawings and texts are selected and interpreted in accordance with the work plan
	1.5 Correct size, type and quantity of materials/components are determined, obtained and inspected for compliance with the job specifications
	1.6 Work is planned in detail including sequencing and prioritising and considerations made, where appropriate, for the maintenance of plant security and capacity in accordance with system/site requirements
	1.7 Coordination requirements, including requests for isolations where appropriate, are resolved with others involved, affected or required by the work

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ELEMENT		PERFORMANCE CRITERIA	
		1.8	Potential hazards are identified and prevention and/or control measures are selected in accordance with the work plan and site procedures
		1.9	Work area is prepared in accordance with work requirements and site procedures
		1.10	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2	Decommission plant or equipment	2.1	Required isolations are confirmed where appropriate in accordance with site requirements
		2.2	Equipment is decommissioned in conjunction with others involved or affected by the work in accordance with the work plan
		2.3	Equipment is disconnected from energy and/or material sources in accordance with the work plan
		2.4	Equipment is decommissioned in accordance with the work plan
3	Remove the plant or equipment	3.1	Required isolations are confirmed where appropriate in accordance with site requirements
		3.2	Removal of plant / equipment or disassembly of major components, is carried out in conjunction with others involved in, or affected by, the work in accordance with the work plan
		3.3	Removal of plant / equipment or disassembly of major components, is carried out mindful of the effect on other plant or structures in accordance with the work plan
		3.4	Where applicable unused electrical conductors are isolated and terminated in accordance with the work plan
		3.5	Other sources of energy or material are terminated and blanked in accordance with the work plan

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ELEMENT	PERFORMANCE CRITERIA
4 Re-commission the plant or equipment	4.1 Plant is de-isolated in accordance with site requirements
	4.2 Pre-operational checks are carried out on plant according to manufacturer's recommendations and site requirements
	4.3 Sequence for re-commissioning procedures are strictly adhered to in accordance with the work plan
	4.4 Plant is tested for correct operation in accordance with manufacturer's and enterprise/site procedures
	4.5 Plant or equipment performance is monitored against manufacturers specifications, using appropriate methods and test equipment in accordance with the work plan
	4.6 Data is collected, interpreted and referenced against specifications and variances recorded
	4.7 Plant or equipment is adjusted to specifications using appropriate techniques in accordance with the work plan
	4.8 Final inspections and performance data collected to ensure compliance with specifications
5 Complete the work	5.1 Work is completed and appropriate personnel notified in accordance with site/enterprise requirements
	5.2 Work area is cleared of waste, cleaned, restored and secured in accordance with site/enterprise procedures
	5.3 Plant, tools and equipment are maintained and stored in accordance with site/enterprise procedures
	5.4 Work completion details are finalised in accordance with site/enterprise procedures

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired undertaken commissioning/decommissioning.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO412B Undertake commissioning-decommissioning

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant environmental, occupational health and safety legislation and regulations
- Enterprise procedures
- Plant drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Relevant plant and equipment, its location and operating parameters
- Principles of commissioning
- Decommissioning procedures
- Re-commissioning procedures
- Test and measurement equipment

T2 Specific skills needed to achieve the Performance Criteria:

- Interpret plant drawings and manufacturers manuals
- Apply relevant state and territory regulations
- Apply decommissioning procedures
- Apply re-commissioning procedures
- Use test and measuring equipment;
- Analyse relevant data
- Identify relevant plant or equipment
- Communicate effectively

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of

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EVIDENCE GUIDE

the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment 9.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be ‘rich’ in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its ‘richness’. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects 9.2)

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of evidence required to demonstrate competency in this unit

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti-Discrimination legislation, regulations, polices and workplace procedure
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Isolation procedures
  - Decommissioning procedures
  - Commissioning procedures
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

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Context of and specific resources for assessment **9.3)**

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working in limited spaces with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

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There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole, providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Plant may include generating sets, transformers, boiler and associated systems; turbine and auxiliaries; Hydro penstocks; Sub-systems, e.g. mill, conveyor, draught fan; electrical/electronic equipment; hydraulic and pneumatic; and water treatment plant.

Energy sources may include electrical, hydraulic, pneumatic, oil, gas and water.

Specifications or reference documentation includes operating, maintenance procedures, manuals, drawings, original equipment manufacturer data and statutory requirements and standards.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations

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UEPOPS413B Coordinate operational strategies for power production

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge for the co-ordination of operational strategies to achieve the short and long term goals of the production plant.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety.

Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

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Prerequisite Unit(s) **4)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 4 Writing 4 Numeracy 4

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT		PERFORMANCE CRITERIA	
1	Coordinate the implementation of the strategy	1.1	Plant operational procedures are implemented in consultation with others and reviewed as required
		1.2	Plant operation and/or condition is monitored and reported against statutory and enterprise requirements taking into account constraints, budget requirements and performance indicators
		1.3	Resources and supplies are coordinated to meet requirements
2	Monitor the strategies	2.1	Deviations from requirements are identified and recorded
		2.2	New requirements that may impact on operating strategy are considered
		2.3	Operating strategy is monitored for suitability/approval with statutory, industry and enterprise/site requirements
3	Report performance against strategy requirements	3.1	Data is collected and processed for review against the established strategy
		3.2	Abnormal operating conditions are reported
		3.3	Changes to the strategy are suggested in accordance with information received

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired co-ordinating operational strategies for power production.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

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REQUIRED SKILLS AND KNOWLEDGE

KS01 - PO413B Coordinate operational strategies for power production

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant environmental, occupational health and safety legislation and regulations
- Enterprise procedures
- Plant drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Relevant plant and equipment, its location and operating parameters
- Power Plant operating parameters
- Relevant performance targets
- Relevant plant reliability targets
- Power Plant efficiency
- Problem solving techniques
- Data collection and recording techniques
- Risk management principles
- Plant operating parameters
- Enterprise recording procedures
- Measurement and analysis systems and procedures
- Communication principles
- Risk management principles.

T2 Specific skills needed to achieve the Performance Criteria:

- Interpret plant drawings and manufacturers manuals
- Apply relevant state and territory regulations
- Apply enterprise recording procedures
- Identify plant status
- Apply problem solving
- Plan and prioritise work
- Communicate effectively
- Apply risk management principles
- Apply data analysis techniques and tools.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of

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EVIDENCE GUIDE

the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment 9.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be ‘rich’ in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its ‘richness’. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects 9.2)

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of evidence required to demonstrate competency in this unit

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti-Discrimination legislation, regulations, polices and workplace procedure
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Plant operating parameters
  - Generation plant and systems
  - Communications
  - Co-ordinating operational strategies
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

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Context of and specific resources for assessment **9.3)**

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working in limited spaces with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

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There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole, providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Strategies include both long and short term.

Reference information includes operational data, maintenance data, market requirements and statutory requirements.

Communication includes liaison with stakeholders.

Reference documentation includes plant reliability and efficiency reports, operating, maintenance procedures, manuals, drawings, original equipment manufacturer data, statutory requirements and standards.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations

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UEPOPS414B Perform risk analysis of generation plant

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to identify and analyse the risk in loss of generation/production plant.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

Pre-Requisites

Prerequisite Unit(s) **4)**

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Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 4 Writing 4 Numeracy 4

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT		PERFORMANCE CRITERIA	
1	Identify risk	1.1	Plant and process maintenance and operational procedures are obtained
		1.2	Plant operating and maintenance history is obtained including relevant incident and failure reports
		1.3	Applicable Occupational Health and Safety and environmental standards are researched
		1.4	Applicable plant and process technical documentation is obtained
		1.5	Analysis objectives are clearly defined
2	Conduct analysis	2.1	Analysis is completed using appropriate methodology in accordance with enterprise/site requirements
		2.2	Incident scenarios are established, and consequences analysed and prioritised for risk
		2.3	Defined objectives are obtained during analysis
		2.4	Specialist assistance is sought when required
3	Produce and implement/monitor recommendations	3.1	Recommendations for preventative action are produced against each risk scenario as appropriate
		3.2	Implementation of recommendations are monitored in accordance with enterprise/site requirements
4	Complete documentation	4.1	Risk analysis, processes, conclusions, scenarios and recommendations are documented
		4.2	Risk analysis report is produced and submitted in accordance with enterprise/site requirements

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired performing risk analysis of generation plants.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01 - PO414B Perform risk analysis of generation plant

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant environmental, occupational health and safety legislation and regulations
- Enterprise procedures
- Plant drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Relevant plant and equipment, its location and operating parameters
- Plant status
- Enterprise recording procedures
- Effects of operating outside design limits
- Risk management principles
- Risk analysis principles
- Problem solving principles
- Problem solving tools
- Leadership principles

T2 Specific skills needed to achieve the Performance Criteria:

- Interpret plant drawings and manufacturers manuals
- Apply relevant state and territory regulations
- Apply enterprise recording procedures
- Identify plant status
- Communicate effectively
- Solve problems
- Provide leadership
- Apply risk management principles
- Apply data analysis techniques and tools.

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Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be ‘rich’ in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its ‘richness’. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

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Critical aspects of evidence required to demonstrate competency in this unit **9.2)**

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti-Discrimination legislation, regulations, polices and workplace procedure
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The knowledge and application of relevant sections of: OHS legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Plant operating parameters
  - Risk management principles and techniques
  - Generating plant and processes
  - Production plant and generation loss monitoring and analysis
  - Identification and implementing of recommendations
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions

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incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working in limited spaces with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment

9.4)

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

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Concurrent assessment and relationship with other units	**9.5)**
	There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.
	Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole, providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Statutory requirements may include Occupational Health and Safety legislation, environmental legislation, standards or codes of practice.

Resource documentation may include operating and maintenance manuals, power plant strategies, national and/or international standards, condition monitoring, plant statistics and reports.

Risk analysis may apply to power generation plant, support equipment or processes found at power generation sites.

Risk analysis may include power plant production loss, personnel safety, loss of generation, environmental impact and commercial risk.

Personnel may include those from various functional areas.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

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Competency Field

Competency Field **11)**

Operations

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UEPOPS416B Monitor the implementation of the enterprise's production-maintenance quality control procedures

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to monitor the implementation of the production or maintenance quality control procedures at the enterprise level.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety.

Pre-Requisites

Prerequisite Unit(s) **4)**

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Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
UEPOPS338B	Maintain quality systems within the team

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 4 Writing 4 Numeracy 4

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the Performance Criteria describe the required performance

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essential outcomes of a competency standard unit	needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT		PERFORMANCE CRITERIA	
1	Plan for quality control	1.1	Occupational Health and Safety standards, statutory requirements, relevant Australian standards, codes of practice, manufacturers' specifications, environmental requirements and enterprise procedures are identified, applied and monitored throughout the work procedure
		1.2	Parameters are established accordance with standard procedures
		1.3	Knowledge of process improvement techniques are used to facilitate work groups to assist in the identification and resolution of quality variances
		1.4	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2	Monitor quality control	2.1	Monitoring equipment is checked for correct calibration and environmental conditions confirmed to ensure reliability and accuracy of tests and results where required
		2.2	Implement the enterprise quality control procedures
		2.3	Deviation and fault data is collected and reported in accordance with procedures
3	Complete documentation	3.1	Calibration records of test equipment maintained in accordance with standard operating procedures where required
		3.2	Documentation is completed in accordance with procedures

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired monitoring the implementation of the enterprise's production/maintenance quality control procedures.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01 - PO416B Monitor the implementation of the enterprise's production/maintenance quality control procedures

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant environmental, occupational health and safety legislation and regulations
- Enterprise procedures
- Plant drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Relevant plant and equipment, its location and operating parameters
- Relevant international and Australian standards
- Quality control procedures, processes and techniques
- Statistical analysis
- Monitoring equipment
- Inspection techniques
- Data analysis

T2 Specific skills needed to achieve the Performance Criteria:

- Interpret plant drawings and manufacturers manuals
- Apply relevant state and territory regulations
- Apply relevant international and Australian standards,
- Apply quality control procedures, processes and techniques
- Monitor quality control processes and techniques
- Perform statistical analysis
- Conduct inspections
- Identify variances to specifications
- Communicate effectively.

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Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be ‘rich’ in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its ‘richness’. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

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Critical aspects of evidence required to demonstrate competency in this unit **9.2)**

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti-Discrimination legislation, regulations, polices and workplace procedure
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - The application of quality control procedures, processes and techniques
  - Using specifications and manuals
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

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Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working in limited spaces with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment

9.4)

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with

9.5)

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other units

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole, providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Quality assurance and quality control standards may refer to international and Australian standards.

Customers may be internal or external.

Monitoring equipment may include precision measuring instrument such as micrometres, multimeter, oscilloscope and vernier callipers, pressure and temperature indicators/recorders and vibration monitors/recorders.

Environmental conditions may be affected by nearby plant or processes.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations

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UEPOPS417B Monitor and implement environmental plans and procedures

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to address the monitoring and implementation of environmental plans and procedures and the development of environmental procedures for the local work area.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 4 Writing 4 Numeracy 4

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the

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Evidence Guide.

Elements and Performance Criteria

ELEMENT		PERFORMANCE CRITERIA	
1	Prepare to Implement Environmental Plans and Procedures	1.1	Environmental plans and procedures are identified and examined in accordance with the work site or project requirements.
		1.2	Environmental risks and impacts are identified for the specific project or work site.
		1.3	Environmental plans and procedures are selected in accordance with the specific project or work site requirements.
2	Implement Environmental Plans and Procedures	2.1	Emergency procedures are implemented and environmental risks are controlled in accordance with project/site requirements
		2.2	Appropriate activities are carried out in accordance with the environmental plan and procedures.
		2.3	Environmental control procedures are implemented, established and maintained, and risks mitigated in accordance with the project/site requirements.
3	Develop Site/Project Environmental Procedures	3.1	Specific needs for project/site environmental procedures are identified and assessed taking into account affected stakeholders and appropriate relevant data.
		3.2	Specific project/site environmental procedures are developed and reviewed in accordance with appropriate relevant data.
4	Manage Environmental Incident	4.1	Environmental incidents are identified and controlled in accordance with the appropriate plans and procedures.
		4.2	Environmental incidents are recorded and reported in accordance with the appropriate plans and procedures.

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ELEMENT	PERFORMANCE CRITERIA
5 Monitor and Report on the Applications of Environmental Plans and Procedures	5.1 The application of environmental plans and procedures are monitored and documented.
	5.2 Environmental risks and incidents are reported in accordance with site/enterprise procedures.
	5.3 Participation by the relevant workforce in reviews of environmental procedures is ensured and reported.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired monitoring and implementing environmental plans and procedures.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO417B Environmental plans and procedures

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant legislative requirements; standard operating procedures; environmental plans and procedures
- Plant drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Relevant plant and equipment, its location and operating parameters
- Enterprise procedures
- Gaseous emission removal equipment, types and characteristics
- Particulate removal equipment types and characteristics
- Water pollution control equipment, types and characteristics
- NOx control equipment, types and characteristics
- Sedimentation and erosion control; risk assessment procedures
- Rare and endangered plants; recording procedures
- Cultural/heritage sites Identification
- Reporting procedures
- Monitoring procedures; identification of risks and impacts

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REQUIRED SKILLS AND KNOWLEDGE

- Consultation procedures
- Incident management procedures
- Potential environmental risks and incidents
- Disposal of dangerous and contaminated soils
- Environmental auditing; concepts of due diligence
- Principles of environmental protection
- Endangered species and habitat protection
- Environmental impact assessment
- Control procedures for environmental risks and incidents
- Waste management.

T2 Specific skills needed to achieve the Performance Criteria:

- Interpret plant drawings and manufacturers manuals
- Apply control procedures at environmental risks and incidents
- Access, interpret and apply relevant legislation and standard operating procedures
- Assess environmental risks at the specific project/site
- Apply environmental plans and procedures
- Develop local workplace environmental procedures
- Identify risks and impacts
- Apply consultation processes
- Manage environmental incidents
- Conduct environmental audits
- Monitor specific project/site
- Identify possible cultural/heritage sites
- Identify potential pollutants
- Solve operational problems.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

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Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be ‘rich’ in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its ‘richness’. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit **9.2)**

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered

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holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti-Discrimination legislation, regulations, polices and workplace procedure
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Relating environmental plans and procedures to the project/site; identifying environmental risks and impacts; integrating operational activities into reviews of environmental procedures; developing project/site procedures; applying environmental plans and procedures to the project/site; monitoring application of environmental plans and procedures; managing environmental incidents at the project/site.
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.

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- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working in limited spaces with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

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Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole, providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Environmental impact is any change to the environment whether adverse or beneficial, wholly or partially resulting from an enterprise's activities, products or services.

Specific project/site may include hydro storage dams, canals, rivers, spillways, drainage sites, workshops, waste disposal sites, power stations, maintenance sites.

Issues, which broad environmental plans and procedures may address, include, but are not restricted to:

National, State or local government; local government/regional development plans; water resources; industry/cross industry; business/enterprise cultural, heritage; conservation/flora/fauna; waste disposal; coastal protection; ground water protection; irrigation; salination control; pollution/litter control; river/surface water systems; chemical management; biological control, i.e. blue green algae; corporate or enterprise.

Environmental risks may include:

impact of mismanagement of chemicals; impact of mismanagement of biological agents; detrimental impact on limited water resources; spillage; waste disposal; detrimental impact on water catchment areas (urban and non-urban); detrimental impact on rivers, waterways and channels; unsatisfactory water and waste water treatment processes; unsatisfactory trade waste treatment and disposal processes; poor construction processes; planning deficiencies.

Environmental legislation may include:

Relevant federal by-laws; relevant State/Territory legislation; relevant local government by-laws; relevant government or quasi government policies and regulations.

Incidents of environmental impact may include:

emissions to air; releases to/of water; releases to land; vibration and noise; disposal of waste; contamination of land; impact on communities; destruction of habitat; use of energy sources; waste generation processes and technologies; impact on culturally significant sites; and may involve the implementation of emergency responses.

Environmental management documentation may include:

information on applicable environmental laws or other requirements; compliant records; training records; process information; process operational log books,; inspection, maintenance and calibration records; relevant contractor and supplier information; incident reports; information on emergency preparedness and response; records of significant environmental impacts; chain of custody and compliance records; audit results; management reviews.

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RANGE STATEMENT

Stakeholders may include:

the enterprise; government (all levels); industry – extractive, other utilities, manufacturing, etc.; community action groups; environmental conservation groups; land care groups; primary producers; the general community and individuals; ATSI groups.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations

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UEPOPS419B Shut down a steam turbine

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to conduct a shut-down of a steam turbine to where it can be placed at rest.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit may require a licence to practise in the workplace in some States or Territories. There may also be additional assessment activities required by regulatory authorities for the issue of the licence to practise.

Practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the

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Evidence Guide.

Elements and Performance Criteria

ELEMENT		PERFORMANCE CRITERIA	
1	Plan and prepare work	1.1	Safety issues are identified to comply with enterprise/site requirements
		1.2	Work requirements are identified from relevant personnel and documentation
		1.3	The turbine shutdown schedule is ascertained from relevant documentation and in accordance with enterprise/site requirements
		1.4	Pre-shutdown checks are carried out on plant according to manufacturer recommendations and site requirements
		1.5	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2	Shutdown steam turbine	2.1	Steam turbine load is reduced in accordance with enterprise and manufacturer operating procedures
		2.2	Steam turbine and generator are removed from the system in accordance with enterprise and manufacturer operating procedures
		2.3	Steam turbine placed on turning gear in accordance with enterprise and manufacturer operating procedures
		2.4	Steam turbine cooled down on turning gear in accordance with enterprise and manufacturer operating procedures
3	Test plant operation	3.1	Tests are performed in accordance with defined procedures applicable to the operational test
		3.2	System and plant is observed for correct operational response

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ELEMENT		PERFORMANCE CRITERIA	
		3.3	Corrective action is taken when response is not in accordance with documentation, plant integrity or personnel safety requirements
		3.4	Plant is returned to required operational status upon completion of test
4	Analyse system faults	4.1	Causes of abnormal plant operating conditions are identified by analysing the technical and operational information in a logical and sequential manner
		4.2	Corrective action taken is in accordance with enterprise/site procedures
		4.3	Plant integrity and personnel safety is maintained through consultation with appropriate personnel, and reference to plant, technical and operational documentation
		4.4	Appropriate personnel are notified when defects are detected
5	Complete documentation	5.1	Documentation is updated and plant problems, movements, abnormalities and status are reported and logged in accordance with enterprise/site procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of shutting-down a steam turbine.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO419B A steam turbine

T1 Evidence shall show that knowledge has been acquired for safe working practices

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REQUIRED SKILLS AND KNOWLEDGE

of:

- Relevant environmental, occupational health and safety legislation and regulations
- Enterprise procedures
- Plant drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Relevant plant and equipment, its location and operating parameters
- Electric motor types and characteristics
- Pump and compressor types and characteristics
- Valve, damper and actuator types and characteristics
- Switchgear types and characteristics
- Electrical protection types and characteristics
- Electrical fundamentals
- Relevant state and territory regulations
- Plant status
- Enterprise recording procedures
- Control and data acquisition systems
- Supervisory, alarm, protection and control equipment
- Emergency procedures
- Turbine speed control equipment
- Heat transfer principles
- The system components and interaction
- Electricity distribution systems a.c. and d.c.
- The system components and their interaction with other plant and equipment external to that covered by this competency
- Station water distribution systems
- Fire protection control systems
- Power and control oil systems, types and characteristics
- Compressed air systems, types and characteristics
- Principles of condensate and feedwater chemical treatment
- Turbine life expenditure and control
- Turbine bypass system, types and characteristics
- Vacuum raising and turbine gland sealing systems
- Thermodynamics
- Properties of matter
- Lubrication and bearings
- Turbine construction and operating principles
- Turbine lubrication and oil systems, types and characteristics
- Condensate and feedwater systems
- Turbine drains, types and characteristics

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REQUIRED SKILLS AND KNOWLEDGE

- Feedwater heating and drainage systems
- Circulating water system, types and characteristics
- Condenser systems, types and characteristics
- Turbine operations
- Generator, types and characteristics
- Turbine efficiency
- Transformers, types and characteristics

T2 Specific skills needed to achieve the Performance Criteria:

- Interpret plant drawings and manufacturers manuals
- Apply relevant state and territory regulations
- Apply enterprise recording procedures
- Identify plant status
- Prepare plant/equipment for operation
- Organise resources
- Shutdown turbine plant and equipment
- Apply turbine cooling techniques and procedures
- Apply diagnostic and testing techniques
- Identify and respond to abnormal plant operating conditions
- Plan and prioritise work
- Use relevant hand tools
- Communicate effectively
- Apply data analysis techniques and tools

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment	**9.1)**
	Longitude competency development approaches to assessment,

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such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also

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comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti-Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Preparation and planning of work
  - Operation of turbine plant and equipment
  - Operationally testing plant
  - Analysing plant faults
  - Monitoring plant operation
  - Knowledge of the system components and their interaction
  - Knowledge of turbine shutdown and cooling processes
  - Knowledge of turbine supervision and control systems
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a

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workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment

9.4)

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note: Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

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Range Statement

RANGE STATEMENT

10) This relates to the unit of competency as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Plant and equipment may include turbine and auxiliary plant turbine by-pass system plant; turbine lubrication and power/control oil systems; condensate and feedwater system plant to boiler economiser inlet valve; condensate polishing plant; high and low pressure heating systems; steam condensing and cooling systems; condenser vacuum raising equipment; turbine gland sealing equipment; condenser cooling water systems plant; boiler feedwater de-aerating equipment; condensate and feedwater chemical treatment equipment; electric motors a.c. and d.c.; electricity distribution systems a.c. and d.c.; diesel engine driven auxiliary plant; station water distribution systems; hydraulic oil system; pumps; compressed air systems; computers with equipment control functions; supervisory, alarm, protection and control equipment; and pumps.

Safety standards may include relevant sections of Occupational Health and Safety legislation, enterprise safety rules, Australian standards, national standards for plant and relevant state and federal legislation.

Information and documentation sources may include verbal or written communications; enterprise safety rules documentation; enterprise operating instructions; manufacturer operational and maintenance manuals; equipment and alarm manuals, enterprise log books, dedicated computer equipment, enterprise standing instructions and plant notes.

Technical and operational indicators may include stimuli (audio, smell, touch, visual), remote or local indicators and recorders, computers and alarms (visible and/or audible).

Communications may be by means of telephone, two way radio, pager, computer (electronic mail) and operating log (written or verbal).

Tests may include motor direction checks, stand-by plant “cut-in” tests, pre and post shut-down tests, valves operating checks, alarm and protection tests and turbine overspeed tests

Appropriate personnel to consult, give or receive direction may include supervisor/team leader or equivalent; technical and engineering officers or equivalent; maintenance staff; power plant operations personnel or equivalent.

Operating environment may be remote from plant and equipment being operated; where operation is assisted by remote indicators of plant status and other parameters monitored; in wet/noisy/dusty/hot areas; during night periods; and during inclement or otherwise harsh weather conditions.

Unit operations may include emergency shut down; turbine shutdown, with or without turbine bypass, or by using forced cooling procedures.

Faults and abnormal operating conditions may include loss of a major auxiliary;

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RANGE STATEMENT

turbine water ingress; excessively high turbine and turbine valves heating/cooling rates/differentials; high condenser vacuum; condenser tube leak; high dissolved oxygen, conductivity; high turbine bearing temperatures/ vibration; high/low bearing oil temperature; loss of turbine bearing oil flow/pressure; low/high pressure heaters malfunctions; turbine bypass system malfunctions; actuator/valve mechanical/electrical faults/failure; failed field devices; and turbine protection.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations.

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UEPOPS420B Coordinate the network system

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required for the co-ordination of a network/system. Systems may be interconnected, remote or isolated.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety.

Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only

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Prerequisite Unit(s) **4)**

after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 4 Writing 4 Numeracy 4

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and prepare network operations	1.1 Information and documentation to determine network/system status is assessed and evaluated in accordance with system requirements
	1.2 Network/system and associated equipment operational pre-requisites are determined in accordance with enterprise/system procedures
	1.3 Work priorities are determined to suit network circumstances in accordance with enterprise/system procedures
	1.4 Network/system limitations and performance due to location and external influences are identified
	1.5 Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training.
2 Coordinate network /system.	2.1 Network/system is operated in accordance with enterprise/system operating procedures
	2.2 Network/system demand is monitored to maintain quality of supply standards in accordance with requirements and to maintain stability and system integrity
	2.3 Network/system load shedding sequence and priorities are monitored to ensure system integrity
	2.4 Corrective actions to rectify deviations are implemented following analysis of data in accordance with system procedures
	2.5 Resources required to meet system requirements are identified and coordinated in accordance with system procedures
	2.6 Where required, operations are carried out in consultation with team members
3 Interpret and respond to network/ system	3.1 Causes of abnormal network/system operating conditions are identified by interpreting the

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ELEMENT	PERFORMANCE CRITERIA	
faults or incidents		technical and operational information in a logistical and sequential manner
	3.2	Operation of protection systems are identified and assessed to evaluate the nature and cause of fault conditions.
	3.3	Communication may be established with other authorities and/or key stakeholders to identify nature/source of system interference
	3.4	Corrective action is taken in accordance with enterprise/system procedures
	3.5	Network/system integrity and safety are maintained through consultation with appropriate personnel and reference to plant technical, operational documentation and contingency plans
4 Complete documentation	4.1	Documentation is updated, log sheets maintained and equipment/system problems, movements abnormalities and status are reported and logged in accordance with enterprise/site procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired co-ordinating the network/system.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO420B Coordinate the network/system

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant environmental, occupational health and safety legislation and regulations

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REQUIRED SKILLS AND KNOWLEDGE

- Enterprise procedures
- Plant drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Relevant plant and equipment, its location and operating parameters
- Switchgear types and characteristics
- Electrical protection types and characteristics
- Electrical principles
- a.c. generators types and characteristics
- Transformers types and characteristics
- Relevant state and territory regulations
- Relevant enterprise/site safety procedures
- Plant status
- Enterprise recording procedures
- System/Network types and characteristics
- Contingency plans
- Problem solving
- Load shedding principles
- Control and data acquisition systems
- Switching practices and procedures

T2 Specific skills needed to achieve the Performance Criteria:

- Interpret plant drawings and manufacturers manuals
- Apply relevant state and territory regulations
- Apply enterprise recording procedures
- Control system/network
- Identify plant status
- Communicate effectively
- Identify and respond to abnormal system operating conditions
- Plan and prioritise work
- Coordinate the operation of system/network to maintain plant integrity,
- Continuity of supply and optimum efficiency
- Direct and coordinate personnel
- Select appropriate load shedding.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of

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EVIDENCE GUIDE

the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. In some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and regulatory policy.

Methods chosen for assessment are influenced by various factors, including the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be ‘rich’ in nature so as to minimise error in judgment.

Activities associated with normal every day work influence decisions as to how much and how detailed the data gathered will contribute to its ‘richness’. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points should be considered when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to **9.2)**

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demonstrate competency in this unit

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti-Discrimination legislation, regulations, polices and workplace procedure
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Relevant system type
  - Preparing for system operations
  - Coordinating a Network/System operation
  - Interpreting and responding to faults and abnormal system operating conditions
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

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Context of and specific resources for assessment **9.3)**

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working in limited spaces with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

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There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole, providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Safety standards may include relevant sections of OHS legislation, enterprise safety rules, relevant State and federal legislation and national standards for plant.

Information and documentation sources may include verbal or written communications; enterprise safety rules documentation; enterprise operating instructions; dedicated computer equipment; enterprise/site standing and operating instructions; enterprise log books; manufacturer operation and maintenance manuals; and equipment and alarm manuals.

Systems may be interconnected, remote or isolated.

Technical and operational indicators may include local indicators and recorders, computers and alarms (visible and or audible).

Key indicators may include voltage, current, reactive power flows, load, equipment loading limits, system node points, frequency and plant status.

Communications may be by means of telephone, two way radio, pager, computer (electronic mail) and operating logs (written or verbal).

Appropriate personnel, team members/other authorities may include supervisor/team leader or equivalent, power plant operations personnel or equivalent, technical and engineering officers or equivalent, maintenance staff, other operating staff or equivalent, system controller, field operators, restricted operators, emergency personnel, network controllers/coordinators, generation controllers, plant operators, field operators, support staff, fire service, police, ambulance, emergency services, enterprise and site representatives, consumers and independent power producers.

Equipment may include machines, circuit breakers, tap changers, protection settings, capacitor/condenser banks, generators and SCADA systems.

Voltage control may be synchronous compensator, generation VAR output, capacitor/condenser, switchgear, tap changers and network configuration.

System integrity may be affected by machine and system stability, transmission line and transformer overloading, correct tap changer position, protection settings, voltage

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RANGE STATEMENT

transformer selection, synchronising, required load shedding selected, capacitor/condenser bank selection, loss of network and generation components.

System limitations may include location, weather conditions, natural disasters, accidents, temperature and power swings.

Contingencies may include responsive spinning reserve, spare/stand-by plant and load shedding.

Types of incidents may include localised blackout, interconnected/isolated power system potential power system threat, accidents, life threatening situations, generation plant and auxiliary plant faults/failure, loss of network and generation components.

Team members/other authorities may include network controllers/coordinators, generation controllers, plant operators, field operators, support staff, fire service, police, ambulance, emergency services, enterprise and site representatives, consumers and independent power producers.

System condition may be voltage profiles, spare plant, generation/transmission capability limits, deviation from generation schedule, variation from normal trends, plant testing, switching programs and responsive spinning reserve.

Network operations may include spurious faults in automatic systems, automatic systems operating out of range, failure of automatic system components and routine plant movement.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations

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UEPOPS422B Schedule generation

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to undertake the scheduling of a generation plant to economically meet forecast demand.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

Pre-Requisites

Prerequisite Unit(s) **4)**

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Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 4 Writing 4 Numeracy 4

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT		PERFORMANCE CRITERIA	
1	Forecast load profile	1.1	Comprehensive information on all variables which have the potential to affect demand is obtained and employed to enable a realistic forecast
		1.2	Information integrity is confirmed and recorded, and deficiencies are detected and rectified
		1.3	Forecast prediction is based on the interpretation of relevant information
		1.4	Forecast outcomes are produced in a time frame that enables system security and economic operation criteria to be maintained
		1.5	Forecast prediction is continuously assessed against real time trends and adjustments made where applicable
		1.6	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2	Identify unit availability and capability	2.1	Unit status information is sought with sufficient regularity to maintain the integrity of scheduling plans
		2.2	Information integrity is confirmed and deficiencies are detected and rectified
		2.3	Information is processed and recorded in a time frame that enables effective scheduling
		2.4	Comprehensive information on all factors which have the potential to affect the unit status is obtained
		2.5	Effective relationships are cultivated and maintained with remote/independent power generators
3	Prepare generation	3.1	Base load generation is scheduled in accordance with contractual obligations and enterprise

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ELEMENT	PERFORMANCE CRITERIA	
unit schedules		procedures
	3.2	Peak load generation is scheduled to meet system demand and maintain adequate spinning reserve capability
	3.3	Units are operated in economic merit within the framework of the enterprise fuel strategies
	3.4	Megawatts and megavar spinning reserve criteria are met at all times in accordance with local instructions
	3.5	System security criteria are met at all times in accordance with enterprise procedures
	3.6	Quality of supply standards are met at all times in accordance with statutory requirements
	3.7	Plant maintenance commitments are incorporated in setting priorities for committing units
	3.8	Schedule is produced with sufficient lead time to allow effective plant movements to occur
	3.9	Power station plant problems are accurately assessed in terms of impact on unit commitment and scheduling requirements
	3.10	Plant testing commitments are incorporated in setting priorities for committing units
4 Implement generation unit schedules	4.1	Circumstances resulting in unexpected changes to demand are identified and managed in accordance with system requirements
	4.2	Transmission system losses are identified and minimised in accordance with system procedures
	4.3	Transmission and generation system status changes are identified and accommodate in accordance with system procedures
	4.4	Fuel supply status changes are identified and accommodated in accordance with system procedures

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ELEMENT	PERFORMANCE CRITERIA
	4.5 Generation outputs are monitored in accordance with system procedures
	4.6 Power station plant problems are assessed in terms of impact on unit commitment and scheduling requirements in accordance with system procedures
	4.7 System fault levels and transmission plant load levels are identified and not exceeded in accordance with system procedures
	4.8 Scheduling of units is timed to optimise system efficiency in accordance with system procedures
	4.9 Scheduling information is recorded and communicated to all stakeholders in accordance with system procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired scheduling generation.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO422B Schedule generation

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant environmental, occupational health and safety legislation and regulations
- Enterprise procedures
- Plant drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Relevant plant and equipment, its location and operating parameters
- Relevant state and territory regulations
- Plant design parameters

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REQUIRED SKILLS AND KNOWLEDGE

- Plant status
- Planning techniques
- Risk management techniques
- Power plant operating parameters
- Enterprise recording procedures
- Systems operating instructions
- Relationships that weather, social and industrial variables have on system demand
- Economic operating criteria including fuel strategies
- Computers and software

T2 Specific skills needed to achieve the Performance Criteria:

- Interpret plant drawings and manufacturers manuals
- Apply relevant state and territory regulations
- Apply relevant statutory legislation
- Apply relevant enterprise/site safety procedures
- Apply enterprise/site emergency procedures and techniques
- Apply enterprise recording procedures
- Schedule plant within design parameters to meet demand
- Identify plant status
- Communicate effectively
- Apply data analysis techniques and tools
- Plan and prioritise work
- Scheduling the generating units to maintain optimum system efficiency
- Operate screen based equipment.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment	**9.1)**

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Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with

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the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti-Discrimination legislation, regulations, polices and workplace procedure
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Forecasting load profiles
  - Identifying unit status
  - Preparing generation schedules
  - Implementing generation schedules
  - Operating and loading characteristics of generation plant
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions

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- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working in limited spaces with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

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Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole, providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Stations/generation plant may include main power station, remotely controlled power station, independent power producers, single and multiple generating sets and interconnected/isolated power systems.

Safety standards may include relevant sections of Occupational Health and Safety legislation, relevant State and federal legislation, national standards for plant and enterprise safety rules.

Information and documentation sources may include verbal or written communications; enterprise safety rules documentation; enterprise operating instructions; dedicated computer equipment; enterprise/site standing and operating instructions; enterprise log books; manufacturer's operation and maintenance manuals; and equipment and alarm manuals.

Technical and operational indicators may include local indicators and recorders and computers.

Communications may be by means of telephone, two way radio, pager, computers (electronic mail) and operating logs (written or verbal).

Appropriate personnel for consultation, give or receive direction may include supervisor/team leader or equivalent, power plant operations personnel or equivalent, technical and engineering officers or equivalent, maintenance staff, other operating staff or equivalent, system controller/network controller, field operator, independent generators and fuel suppliers.

Strategies and resources may include fuel, quality of supply, contract and commitments.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

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Competency Field **11)**

Operations

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UEPOPS423B Plan a scheduled outage

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to plan for a scheduled outage.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

Pre-Requisites

Prerequisite Unit(s) **4)**

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Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 4 Writing 4 Numeracy 4

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT		PERFORMANCE CRITERIA	
1	Identify outage requirements	1.1	Outage requirements are identified from notification of requirement, work orders or equivalent and clarified with the appropriate parties and/or site inspection
		1.2	Safety issues are identified to comply with statutory enterprise and site requirements
		1.3	Date, time and expected duration of outage is assessed and confirmed
		1.4	Schematic diagrams, drawings, plans and/or maps are consulted to determine area affected
		1.5	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training.
2	Create outage plan	2.1	Statistical records are consulted to ascertain most favourable time for outage
		2.2	Implications of outage are identified and assessed to ascertain impact of outage
		2.3	Identify key stakeholders and/or equipment affected
		2.4	Current status of affected equipment and consumers is identified and assessed
		2.5	Consult with all key stakeholders to determine whether contingency plans require implementation and/or timetables require review is carried out in accordance with enterprise policy
		2.6	Disruptions to key consumers are minimised by providing alternative routes of supply
		2.7	Scope of work to be carried out during outage is evaluated against the allocated time frame.
		2.8	Types of permits required to undergo work prior

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ELEMENT		PERFORMANCE CRITERIA	
			to and during outage are established in accordance with enterprise procedures
		2.9	Notification of requirement or other pre-emptive request is approved in accordance with enterprise procedures
3	Implement outage plan	3.1	Work crews are notified of the outage plan through the appropriate channels in accordance with enterprise procedures
		3.2	Notification of outage is communicated to all stakeholders in accordance with enterprise procedures
4	Complete documentation	4.1	Documentation is updated, files and records maintained in accordance with enterprise/site procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired in planning a scheduled outage.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO423B A scheduled outage

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant environmental, occupational health and safety legislation and regulations
- Enterprise procedures
- Plant drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Relevant plant and equipment, its location and operating parameters
- Contract management
- Liaising with contractors and clients

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REQUIRED SKILLS AND KNOWLEDGE

- Project management
- Project planning
- Risk management
- Leadership techniques
- Plant status
- Communications principles
- Computers and software

T2 Specific skills needed to achieve the Performance Criteria:

- Interpret plant drawings and manufacturers manuals
- Apply enterprise recording procedures
- Identify plant status
- Communicate effectively
- Apply data analysis techniques and tools
- Plan and prioritise work
- Communicate with public and key stake holder.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that,

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in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and

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Range Statement

- Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
- Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
- Demonstrate an appropriate level of employability skills
- Conduct work observing the relevant Anti-Discrimination legislation, regulations, polices and workplace procedure

- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Investigating and understanding implications of outage
  - Identifying and advising key stakeholders
  - Identifying outage requirements
  - Creating outage plans
  - Conducting meetings
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

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In addition to the resources listed above in Context of assessment', evidence should show competency working in limited spaces with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment

9.4)

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole, providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Safety standards may include relevant sections of Occupational Health and Safety legislation, enterprise safety rules, relevant State and federal legislation and national

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RANGE STATEMENT

standards for plant.

Information and documentation sources may include verbal or written communications; enterprise safety rules documentation; enterprise operating instructions; dedicated computer equipment; enterprise/site standing and operating instructions; enterprise log books; manufacturer's operation and maintenance manuals; and equipment and alarm manuals.

Communications may be by means of telephone, two way radio, pager, computers (electronic mail) and operating logs (written or verbal).

Appropriate personnel for consultation, give or receive direction may include supervisor/team leader or equivalent, power plant operations personnel or equivalent, technical and engineering officers or equivalent, maintenance staff, other operating staff or equivalent and system/network controllers.

Type of scheduled outages may be distribution/network H.V. bus section, generation plant, major auxiliary plant, fuel supply, L.V. switchboards and transmissions.

Consumers and key stakeholders may include domestic customers, essential services, police, fire service, emergency services, local councils, corporate enterprises, industry, internal enterprise management, operators, controllers, maintenance personnel, contractors and independent power utilities.

Notification may include television, radio, newspaper, mail, telephone, e-mail memos and notices.

Documentation may include operations project file, records, reports, computers, memos, notification of requirement and work orders.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations

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UEPOPS424B Coordinate local H.V. networks

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to coordinate the local control and management of HV substations and/or local networks.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

Pre-Requisites

Prerequisite Unit(s) **4)**

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Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 4 Writing 4 Numeracy 4

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and prepare work	1.1 Documentation to determine substation/ network status is assessed and evaluated
	1.2 Substation and local network equipment operational pre-requisites are established in accordance with manufacturers and enterprise/site procedures
	1.3 Sequence for operating network section and equipment is determined to suit existing circumstances in accordance with enterprise/site requirements
	1.4 Relevant information to forecast and plan responses for efficient operation is utilised
	1.5 Regular consultation with key stakeholders is maintained and requirements recognised
	1.6 Implications of operators actions to the system are identified and assessed
	1.7 Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2 Operate, monitor and control local network	2.1 The local system is operated in accordance with enterprise/site operating procedures
	2.2 Local network voltage and current requirements are assessed and evaluated to maintain stability and system integrity
	2.3 Voltage/load profiles are identified and adhered to in accordance with enterprise operating procedures
	2.4 Corrective actions to rectify abnormalities are implemented following analysis of data in accordance with manufacturer’s and system procedures
	2.5 Resources required are identified and

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ELEMENT		PERFORMANCE CRITERIA	
			coordinated to meet system requirements
		2.6	Operations are carried out in consultation with team members in accordance with system procedures
3	Analyse and respond to local network/system faults or incidents	3.1	Cause of fault conditions are identified by analysing the technical, operational information and in consultation with system control
		3.2	Operation of protection systems is identified and assessed to evaluate the nature and cause of fault conditions
		3.3	Communication is established with other authorities and/or key stakeholders to identify nature/source of system interference (where required)
		3.4	Corrective action is taken in accordance with enterprise/system procedures
		3.5	Local system integrity and personnel safety are maintained through consultation with appropriate personnel and reference to plant technical, operational documentation and contingency plans.
4	Review incident response and preventative procedures	4.1	Incident responses are assessed and reviewed in accordance with system procedures
		4.2	Alternative responses/contingencies are identified and assessed in accordance with system procedures
		4.3	Alternative responses/contingencies are documented and approved in accordance with system procedures
5	Complete documentation	5.1	Documentation is updated, log sheets maintained and equipment/system problems, movements, abnormalities and status are reported and logged in accordance with enterprise/site procedures.

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired co-ordinating local H.V. networks.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO424B Local H.V. networks

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant environmental, occupational health and safety legislation and regulations
- Enterprise procedures
- Plant drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Relevant plant and equipment, its location and operating parameters
- Relevant state and territory regulations
- Electric motor types and characteristics
- Switchgear types and characteristics
- Electrical protection types and characteristics
- Electrical principles
- Transformers types and characteristics
- Local H.V networks types and characteristics
- Plant status
- Enterprise recording procedures
- Contingency plans
- Supervisory, alarm, protection and control equipment
- Switching practices and procedures

T2 Specific skills needed to achieve the Performance Criteria:

- Interpret plant drawings and manufacturers manuals
- Apply relevant state and territory regulations
- Apply enterprise recording procedures
- Manager and control system/network
- Identify plant status
- Communicate effectively
- Apply data analysis techniques and tools
- Identify and respond to abnormal system operating conditions

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REQUIRED SKILLS AND KNOWLEDGE

- Plan and prioritise work
- Apply stress management techniques
- Direct and coordinate personnel
- Select appropriate load shedding
- Apply diagnostic techniques.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence

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need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti-Discrimination legislation, regulations, polices and workplace procedure
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The knowledge and application of relevant sections of:

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Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures

- Preparing for system operations
- Managing and controlling system operations
- Coordination requirements
- Identifying and responding to abnormal system operating conditions
- Impact of actions
- Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment **9.3)**

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working in limited spaces with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

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Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole, providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Safety standards may include relevant sections of Occupational Health and Safety legislation, enterprise safety rules, relevant State and federal legislation and national standards for plant.

Information and documentation sources may include verbal or written communications; enterprise safety rules documentation; enterprise operating instructions; dedicated computer equipment; enterprise/site standing and operating instructions; enterprise log books; manufacturer’s operation and maintenance manuals; and equipment and alarm manuals.

Technical and operational indicators may include local indicators and recorders, computers and alarms (visible and or audible).

Key indicators may include voltage, current, reactive power flows, load, equipment loading limits, system node points and plant status.

Communications may be by means of telephone, two way radio, pager, computer (electronic mail) and operating logs (written or verbal).

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RANGE STATEMENT

Appropriate personnel for consultation, give or receive direction may include supervisor/team leader or equivalent, power plant operations personnel or equivalent, technical and engineering officers or equivalent, maintenance staff, other operating staff or equivalent, system/network controller, field operators and restricted H.V. operators.

Voltage control may be capacitor/condenser, switchgear, tap changers and network configuration.

Network implications may include system stability, line and transformer overloading, correct tap changer position, protection settings voltage transformer selection and synchronising.

Network limitations may include location, weather conditions, natural disasters, accidents, temperature and power swings.

System conditions may include voltage profiles, spare plant, line capacity limits, variations from normal trends, plant testing and switching programs.

Plant and equipment may include circuit breakers, tap changers, protection settings, capacitor/condenser banks, overhead switchgear, underground switchgear, transformers, protection indicators and substations.

Operating environment may be remote from plant and equipment being operated (operation is assisted by remote indicators), during inclement or harsh weather conditions, in wet/noisy/dusty areas or during night periods.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations

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UEPOPS425B Produce maintenance plans for generation production plant

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to undertake the establishment and implementation of maintenance plans for generation production plant that may include boiler, turbine, hydro, electrical, control and monitoring, ash and dust; water treatment and fuel plant.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 4 Writing 4 Numeracy 4

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the

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Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Research and plan for maintenance	1.1 Work requirements are identified, scoped and clarified/confirmed with appropriate parties or by site inspection
	1.2 Occupational Health and Safety standards, statutory requirements, relevant Australian standards, codes of practice, manufacturers' specifications, environmental requirements and enterprise procedures are identified, applied and monitored throughout the work procedure.
	1.3 Resources required to satisfy the work plan are identified, obtained and inspected for compliance with the job specifications
	1.4 Relevant plans, drawings and texts are selected and interpreted in accordance with the work plan
	1.5 Maintenance is planned in detail including sequencing and prioritising and considerations made, where appropriate, for the maintenance of plant security and capacity in accordance with system/site requirements
	1.6 Coordination requirements, including requests for isolations where appropriate, are resolved with others involved, affected or required by the work
	1.7 Potential hazards are identified and prevention and/or control measures are selected
	1.8 Plant operating/maintenance history, condition monitoring information, recent modifications and existing plant status are addressed in defining work scope
	1.9 Costing of work is undertaken and impact on budget is assessed

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ELEMENT	PERFORMANCE CRITERIA	
	1.10	Needs for operational testing and/or re-commissioning are identified
	1.11	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2 Develop maintenance plan	2.1	Work scope is scheduled into a plan in accordance with established criteria
	2.2	Plant isolation and access requests are documented in accordance with enterprise requirements
	2.3	Plans are developed in conjunction with other affected groups in accordance with enterprise requirements
	2.4	Availability of resources is confirmed and documented in accordance with enterprise requirements
	2.5	Information relevant to work activities is attached to maintenance plan in accordance with enterprise requirements
	2.6	Maintenance plan and associated information is documented and distributed to all affected staff in accordance with enterprise communication systems
	2.7	Maintenance methods are drafted in accordance with criteria developed in research
	2.8	Maintenance methods in a document formatted in accordance with enterprise requirements
	2.9	Methods are presented for review to relevant staff in accordance with enterprise requirements
3 Implement and monitor maintenance plan	3.1	Maintenance information is allocated to appropriate staff
	3.2	Feedback is sought on application/progress of maintenance methods and plans

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ELEMENT	PERFORMANCE CRITERIA	
	3.3	Maintenance methods and plans are modified to reflect feedback obtained
	3.4	Modification of method/plan is reviewed/ approved by relevant staff
	3.5	Amended/updated documentation is distributed to relevant staff in accordance with enterprise communication systems

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired producing maintenance plans for generation production plants.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO425B Maintenance plans for generation production plant

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant environmental, occupational health and safety legislation and regulations
- Enterprise procedures
- Plant drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Relevant plant and equipment, its location and operating parameters
- Contract management
- Liaising with contractors and clients
- Project management
- Project planning
- Risk management
- Leadership techniques
- Maintenance plan development;
- Maintenance philosophies and work practices
- Strategic plan objectives and principles of application

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REQUIRED SKILLS AND KNOWLEDGE

- Computer systems
- Quality assurance/quality control
- Maintenance techniques, procedures and requirements;

T2 Specific skills needed to achieve the Performance Criteria:

- Interpret plant drawings and manufacturers manuals
- Apply risk management and quality assurance/quality control principles;
- Prioritise options and work;
- Solve problems;
- Communicate effectively;
- Analyse relevant information;
- Apply data analysis techniques and tools;
- Produce maintenance plans;
- Apply maintenance planning principles;
- Identify maintenance requirements.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and

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regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as

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specified in the Performance Criteria and Range Statement
    - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
    - Demonstrate an appropriate level of employability skills
    - Conduct work observing the relevant Anti-Discrimination legislation, regulations, polices and workplace procedure
- Demonstrated performance across a representative range of contexts from the prescribed items below:
    - The knowledge and application of relevant sections of: OHS legislation, statutory legislation, enterprise/site safety procedures and enterprise/site emergency procedures.
    - Maintenance plan development
    - Maintenance philosophies
    - Engineering principles
    - Maintenance techniques
    - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit must be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working in limited spaces with different types of plant and equipment as well as different structural/construction types and methods and in a variety of

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environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole, providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Generation production plant and equipment may include boiler, turbine, hydro, electrical, control and monitoring, ash and dust, water treatment and fuel plant.

Plans may include either, long, medium and short term.

Budget may include costs for labour, materials, training, services, tools and equipment.

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RANGE STATEMENT

Reference information may include benchmarking reports, maintenance data, market requirements, plant budgets, strategic plans and manufacturer specifications.

Communication may include liaison with customers such as plant owners, operating staff, maintenance staff, supervisors and external organisations.

Produced documents may include maintenance reports.

Implementation plans may include use of the services of maintenance and planning staff.

Power generation demands may include either long or short term perspectives.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations

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UEPOPS426B Interpret and analyse multi-operation protection devices

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to interpret and analyse multi-operation high voltage protection schemes.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety.

Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

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Prerequisite Unit(s) **4)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
UEPOPS342B	Interpret and analyse single operation protection devices

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 4 Writing 4 Numeracy 4

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the

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competency standard unit Evidence Guide.

Elements and Performance Criteria

ELEMENT		PERFORMANCE CRITERIA	
1	Respond to protection operation	1.1	Protection operation is confirmed in accordance with enterprise procedures
		1.2	Apparatus affected is identified in accordance with enterprise procedures
		1.3	Targets, flags and alarms are identified and recorded in accordance with enterprise/site procedure
		1.4	Relevant stakeholders are advised in accordance with enterprise procedures
		1.5	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2	Interpret and determine cause of protection operation	2.1	External information is managed and communication with external stakeholders is conducted and recorded in accordance with enterprise procedures
		2.2	Information is collated and assessed in a logical and sequential manner in accordance with enterprise procedures
		2.3	Sequence of events prior to and following protection operation is identified and assessed in accordance with enterprise procedures
		2.4	Multiple protection operations are assessed and evaluated in accordance with enterprise procedures
		2.5	Findings are analysed in conjunction with protection type and recorded data, to determine most probable cause of protection operation
3	Restore protection	3.1	All relevant stakeholders are informed of findings and plan of action in accordance with

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ELEMENT	PERFORMANCE CRITERIA	
		enterprise procedures
	3.2	Relevant protection indicators are reset in accordance with enterprise procedures
	3.3	Corrective action is taken according to fault type in accordance with enterprise/site procedures
4 Complete documentation	4.1	Records are maintained and all events and operations are logged in accordance with enterprise procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired abilities to interpret and analyse multi-operation protection devices.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO 426B Multi-operation protection devices

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant environmental, occupational health and safety legislation and regulations
- Enterprise procedures
- Plant drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Relevant plant and equipment, its location and operating parameters
- Relevant state and territory regulations
- Electric motor types and characteristics
- Switchgear types and characteristics
- Electrical protection types and characteristics
- Electrical principles
- Transformers types and characteristics
- Plant status;
- Plant operating parameters;

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REQUIRED SKILLS AND KNOWLEDGE

- Enterprise recording procedures;
- Responding to protection equipment operation
- Interpreting and determining cause of equipment operation;
- Restoring protection;

T2 Specific skills needed to achieve the Performance Criteria:

- Interpret plant drawings and manufacturers manuals
- Apply relevant state and territory regulations
- Apply enterprise recording procedures;
- Identify plant status;
- Communicate effectively;
- Apply data analysis techniques and tools;
- Apply diagnostic techniques;
- Apply or determine appropriate corrective actions required;
- Plan and prioritise work;
- Recognise abnormal plant/system/equipment operating conditions;
- Evaluate protection operation and determine the appropriate response.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment	**9.1)**
	Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency

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in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control

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measures as specified in the Performance Criteria and Range Statement
    - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
    - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
    - Demonstrate an appropriate level of employability skills
    - Conduct work observing the relevant Anti-Discrimination legislation, regulations, polices and workplace procedure
- Demonstrated performance across a representative range of contexts from the prescribed items below:
    - The knowledge and application of relevant sections of Occupational Health and Safety legislation, statutory legislation, enterprise/site safety procedures, enterprise/site emergency procedures, responding to protection equipment operation, interpreting and determining cause of equipment operation and restoring protection. The knowledge of protection equipment and schemes
    - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working in limited spaces with

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different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole, providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Protection may include restricted earth fault, frame leakage, over current (instantaneous/inverse definite minimum time), earth fault (instantaneous/inverse definite minimum time), sensitive earth fault, phase differential, transformer differential, pilot wire differential, busbar differential, phase failure, under frequency load shedding, auto recloser, oil circuit recloser, air circuit recloser, directional earth

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RANGE STATEMENT

fault, back up timer, reverse power, generator earth/fault, auto trip, and distance protection.

Safety standards may include relevant sections of Occupational Health and Safety legislation, enterprise safety rules, relevant State and federal legislation and national standards for plant.

Information and documentation sources may include verbal or written communications; enterprise safety rules documentation; enterprise operating instructions; dedicated computer equipment; enterprise/site standing and operating instructions; enterprise log books; manufacturer's operation and maintenance manuals; and equipment and alarm manuals.

Technical and operational indicators may include stimuli (audio, smell, touch, visual), local indicators and recorders, computers and alarms (visible and or audible).

Communications may be by means of telephone, two way radio, pager, computer (electronic mail) and operating logs (written or verbal).

Appropriate personnel for consultation, giving or receiving direction may include supervisor/team leader or equivalent, power plant operations personnel or equivalent, technical and engineering officers or equivalent, maintenance staff, other operating staff or equivalent, system controller/network controller, field operator, restricted H.V. operators, independent generators and customers.

Operating environment may be remote from plant and equipment being operated, (operation is assisted by remote indicators of plant status and other parameters monitored), during inclement or otherwise harsh weather conditions, in wet/noisy/dusty areas or during night periods.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations

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UEPOPS428B Develop H.V. switching programs

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to develop switching programs where multiple sources of supply must be considered and managed.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

Pre-Requisites

Prerequisite Unit(s) **4)**

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Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 4 Writing 4 Numeracy 4

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT		PERFORMANCE CRITERIA	
1	Interpret requirements	1.1	Notification of requirement is confirmed and assessed
		1.2	Area of planned outage is identified using system diagrams, drawings and/or maps, in consultation with appropriate personnel
		1.3	Planned work details are interpreted from outage request or equivalent and stated on the draft program
		1.4	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2	Research switching programme	2.1	Implications of switching program on the system are identified and recognised
		2.2	Types and function of switchgear to be operated are identified and their suitability for operation under forecast system conditions during scheduled outage is assessed
		2.3	System loadings, limitations and alternate supply route capabilities are evaluated to ensure system integrity
		2.4	Consultation with appropriate parties affected by the switching programme is undertaken in accordance with enterprise procedures
		2.5	Consideration is given to geographical and/or site location of isolation points to conclude shortest possible route when determining sequence of switching steps in order to minimise outage time
		2.6	Isolated work area is appraised to ensure safe working clearances are maintained in accordance with mandatory regulations and enterprise/site requirements
		2.7	H.V./L.V. and control circuitry is examined to

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ELEMENT	PERFORMANCE CRITERIA	
		ensure no back-feed to work is possible
3 Draft switching program	3.1	Draft is formatted in logical sequential steps, stating location, apparatus, apparatus ID and operation to be conducted
	3.2	Permit to work procedures are entered at correct step in program
	3.3	Program is planned to ensure access, work and reinstatement take place in a logical and sequential manner
	3.4	Switching program is checked for errors and omissions in accordance with enterprise procedures
	3.5	All documentation supporting the program is filled out requirements in accordance with enterprise procedures
4 Validate program	4.1	Switching program is forwarded to appropriate personnel for checking and verification in accordance with enterprise procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired developing H.V. switching programs.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO428B H.V. switching programs

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant environmental, occupational health and safety legislation and regulations
- Enterprise procedures

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REQUIRED SKILLS AND KNOWLEDGE

- Plant drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Relevant plant and equipment, its location and operating parameters
- Relevant state and territory regulations
- Switchgear types and characteristics
- Electrical protection types and characteristics
- Electrical principles
- a.c. generators types and characteristics
- Transformers types and characteristics
- Plant status
- Enterprise recording procedures
- Interconnected utilities systems and equipment
- Network systems
- Isolating, tagging and earthing procedures
- Control systems

T2 Specific skills needed to achieve the Performance Criteria:

- Interpret plant drawings and manufacturers manuals
- Apply relevant state and territory regulations
- Apply enterprise recording procedures
- Identify plant status
- Communicate effectively
- Use data analysis techniques and tools
- Apply or determine appropriate corrective actions required
- Plan and prioritise work
- Write switching programmes.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

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Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be ‘rich’ in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its ‘richness’. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit **9.2)**

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered

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holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti-Discrimination legislation, regulations, polices and workplace procedure
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures, Researching switching programmes, Drafting switching programmes, Validation procedures
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

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Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working in limited spaces with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

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Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole, providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Program may include operations where primary and secondary isolations are required to isolate a work area, operations where switching involves multiple and interconnecting power generating utilities, commissioning/isolating/ paralleling zone substation plant, transmission systems, bus sections, zone transformers and interconnected power supplies.

Safety standards may include relevant sections of Occupational Health and Safety legislation, enterprise safety rules, relevant State and federal legislation and national standards for plant.

Information and documentation sources may include verbal or written communications; enterprise safety rules documentation; enterprise operating instructions; dedicated computer equipment; enterprise/site standing and operating instructions; enterprise log books; manufacturer's operation and maintenance manuals; and equipment and alarm manuals.

Communications may be by means of telephone, two way radio, pager, computer (electronic mail) and operating logs (written or verbal).

Appropriate personnel for consultation, to give or receive direction may include supervisor/team leader or equivalent, power plant operations personnel or equivalent, technical and engineering officers or equivalent, maintenance staff, other operating staff or equivalent, network/system controllers, field operators, line workers, external customers, project leaders and authorising officer.

Secondary isolations may include VTs, UPS supply, control systems, plant auxiliaries and d.c. supplies.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

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Competency Field 11)

Operations

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UEPOPS430B Control permit to work operations

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to perform work in association with a permit system.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety.

Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been

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Prerequisite Unit(s) **4)**

confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 4 Writing 4 Numeracy 4

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and prepare for permit to work procedures	1.1 Work requirements are identified from request/work orders or equivalent and clarified/confirmed.
	1.2 Relevant information and documentation is obtained in accordance with enterprise policy/procedures.
	1.3 Occupational Health and Safety standards, enterprise procedures/requirements are identified and monitored throughout the work procedure.
	1.4 Plant is identified in accordance with enterprise procedures.
	1.5 Consultation with all key stakeholders to identify state of plant, requirements, isolations and timetables is confirmed in accordance with enterprise procedures
	1.6 Where appropriate, the teams and individuals roles and responsibilities within the team are identified, and where required, assist in the provision of on-the-job training
2 Perform permit duties	2.1 Permit is obtained and interpreted to confirm accuracy and relevance in accordance with job requirements.
	2.2 Isolations and appropriate barriers/tagging are confirmed in accordance with permit instructions.
	2.3 Permit requirements are conveyed and clarified to others involved or affected by the work in accordance with permit requirements.
	2.4 Others involved are "signed-on" to the permit prior to the commencement of work in accordance with permit requirements
	2.5 Permit conditions are monitored throughout the work sequence in accordance with permit requirements.

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ELEMENT	PERFORMANCE CRITERIA	
3 Complete the work	3.1	Plant is inspected and returned to normal, to ensure it is safe to return to service and all staff working are warned to remain clear.
	3.2	All staff signed on are to sign off to indicate their authority to work is removed.
	3.3	Work is completed and appropriate personnel notified in accordance with site/enterprise requirements

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired controlling permits to work operations.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO430B Permit to work operations

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant environmental, occupational health and safety legislation and regulations
- Enterprise procedures
- Plant drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Relevant plant and equipment, its location
- Enterprise recording procedures
- Mechanical equipment isolation techniques
- Electrical equipment isolation techniques
- Mechanical isolation equipment types and characteristics
- Electrical isolation equipment types and characteristics

T2 Specific skills needed to achieve the Performance Criteria:

- Interpret plant drawings and manufacturers manuals

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REQUIRED SKILLS AND KNOWLEDGE

- Locate relevant plant and equipment
- Identify plant status
- Plan and prioritise work
- Apply planning principles and techniques
- Communicate effectively

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence

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need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti-Discrimination legislation, regulations, polices and workplace procedure
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The knowledge and application of relevant sections of:

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Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures, permit to work system procedures

- Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment **9.3)**

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working in limited spaces with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended

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for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole, providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Permits may refer to Maintenance Access Permits, Electrical Access Permits, Mechanical Permits, Testing Permits, Restricted use Permits, Out of Service Declarations, Confined Space Entry Permits, Decommissioning/Recommissioning Statements and associated request forms.

Appropriate personnel may include project engineers and leaders, maintenance personnel, operations personnel, internal and external specialist services personnel, line management, contractors and standing permit to work and/or safety committees.

Documentation may include Occupational Health and Safety and environmental legislation, industry standards, enterprise safety and/or permit to work rules, enterprise and site procedures, enterprise permit to work documentation/form(s), and computer based software packages.

Resources may include approved documentation/form(s), manpower, isolation equipment (locking devices, signs etc.) and computers.

Permit to work may include any approved documentation/form(s) controlled by the safety rules or permit to work procedures of the enterprise.

Incidents may refer to permit to work system breaches.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information

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RANGE STATEMENT

and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations

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UEPOPS431B Collect and analyse hydrological and meteorological data

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to predict and determine inflows in catchment areas.

Application of the Unit

Application of the Unit **2)**

This competency standards unit shall apply to catchment areas within a hydro-powered electricity generation system.

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
UEPOPS209B	Perform process plant inspection

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 4 Writing 4 Numeracy 4

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

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Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT		PERFORMANCE CRITERIA	
1	Plan for work related issues	1.1	Safety issues are identified to comply with enterprise/site requirements
		1.2	Work, plant and resource requirements are identified from relevant information and documentation
		1.3	Pre operational checks are carried out in accordance with enterprise and site requirements
		1.4	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training.
2	Plan and prepare to conduct data collection	2.1	Select appropriate equipment to conduct the data collection
		2.2	Pre-calibrate the equipment in preparation for survey according to manufacturer’s specifications
		2.3	Assess the potential hazards in accordance with enterprise procedures.
		2.4	Assess meteorological charts and data to assist with planning for the conduct of a data collection activity.
3	Undertake data collection	3.1	Establishing the measurement site
		3.2	Set out the instrumentation in accordance with manufacturer’s specifications.
		3.3	Perform the measurement in accordance with

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ELEMENT	PERFORMANCE CRITERIA	
		enterprise requirements.
	3.4	Record measurements following enterprise procedures
	3.5	Clean and store tools and equipment
4 Verify and report data collection initial analysis	4.1	Analyse measurements to verify accuracy of findings.
		Enter data into appropriate data systems
5 Complete documentation	5.1	Complete work order requirements according to enterprise procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired collecting and analysing hydrological and meteorological data.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO431B Hydrological and meteorological data

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant environmental, occupational health and safety legislation and regulations
- Enterprise procedures
- Plant drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Relevant plant and equipment, its location and operating parameters
- Systems components and interactions
- Prospective inflow forecasting
- Snow depth gauging
- Interpreting meteorological charts
- Stream gauging
- Water quality monitoring

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REQUIRED SKILLS AND KNOWLEDGE

- Calibration of instrumentation
- Interpretation of hydrological data
- Interpretation of meteorological data
- Survival techniques, hypothermia, snake avoidance

T2 Specific skills needed to achieve the Performance Criteria:

- Interpret plant drawings and manufacturers manuals
- Apply enterprise recording procedure
- Communicate effectively,
- Apply data analysis techniques and tools;
- Recognise abnormal conditions;
- Apply or determine appropriate corrective actions required;
- Plan and prioritise work;
- Personnel safety;
- Coordinate the operation of equipment to maintain optimum efficiency,
- Application of meteorological and hydrographical instrumentation
- Measure snow depth
- Determine inflows based on snow melt
- Measure stream flows
- Complete flow calculations
- Conduct depth measurements
- Apply survival techniques, hypothermia, snake avoidance

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment	**9.1)**
	Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best

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utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated

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within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:

- Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
- Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
- Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
- Demonstrate an appropriate level of employability skills
- Conduct work observing the relevant Anti-Discrimination legislation, regulations, polices and workplace procedure

- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures, Remote location procedures
  - OHS principles (e.g. Survival techniques, hypothermia, snake avoidance
  - Safe working practices
  - Working alone
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or

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simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working in limited spaces with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

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RANGE STATEMENT

10) This relates to the competency standard unit as a whole, providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Meteorological charts and data.

Record Keeping Data Systems (Electronic and hard copy).

Stream gauging equipment.

Water and snow depth gauges.

Water sampling analysing equipment.

Meteorological and Hydrographical instrumentation: Wind speeds, Relative humidity, Temperature, Precipitation levels.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations

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UEPOPS432B Start up a heat recovery steam generator unit

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to prepare a Heat Recovery Steam Generator for service.

Placing the Heat Recovery Steam Generator in service will require the admission of the heating medium and the control the level of water within the steam/water drums, the flow and quality of the feedwater, the rate of steam pressure and temperature increase and the rate of rise of metal temperatures within design limits to the point at which the Heat Recovery Steam Generator is supplying a constant flow of steam at rated temperature and pressure to the consumer.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit are subject to regulations directly related to Occupational Health and Safety. Individuals may require a licence to practise in the workplace depending on the requirements of the various State OHS regulations.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
UEPOPS333B	Operate and monitor H.R.S.G. hot gas control system

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 4 Writing 4 Numeracy 4

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

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Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT		PERFORMANCE CRITERIA	
1	Plan and prepare work	1.1	Safety issues are identified to comply with enterprise/site requirements
		1.2	Work requirements are identified from relevant personnel and documentation
		1.3	Pre-operational checks are carried out on plant according to manufacturer's recommendations and site requirements.
		1.4	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training.
2	Start up a heat recovery steam generator unit	2.1	Pre-operation conditions of the Heat Recovery Steam Generator and Gas Turbine are established in accordance with enterprise standards and site requirements.
		2.2	Minimum operation of gas turbine is established and supported in accordance with enterprise, manufacturer's and site requirements.
		2.3	Monitoring of Heat Recovery Steam Generator drum level, feedwater flow, steam and metal temperature rates of rise, steam pressure rate of rise and control of steam flow and drainage is carried out in accordance with manufacturer's and site requirements
		2.4	Gas Turbine exhaust gas temperature and flow to the Heat Recovery Steam Generator and Gas Turbine power output are adjusted to achieve required steam conditions and demand,

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ELEMENT		PERFORMANCE CRITERIA	
			observing operating requirements
		2.5	Plant is operated within limits of plant design, enterprise or site requirements.
		2.6	Plant is monitored and observed to detect deviations from required operating conditions.
		2.7	Corrective action is taken to rectify abnormalities in accordance with manufacturer's and enterprise/site procedures
3	Test Plant Operation	3.1	Tests are performed in accordance with defined procedures applicable to the operational test.
		3.2	System and plant is observed for correct operational response.
		3.3	Corrective action is taken when response is not in accordance with documentation, plant integrity or personnel safety requirements.
		3.4	Plant is returned to required operational status upon completion of test.
4	Analyse system faults	4.1	Causes of abnormal plant operating conditions are identified by analysing the technical and operational information in a logical and sequential manner.
		4.2	Corrective action taken is in accordance with enterprise/site procedures
		4.3	Plant integrity and personnel safety is maintained through consultation with appropriate personnel, and reference to plant, technical and operational documentation
		4.4	Appropriate personnel are notified when defects are detected.
5	Complete documentation	5.1	Documentation is updated and plant problems, movements, abnormalities and status are reported and logged in accordance with enterprise/site procedures.

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired starting up a heat recovery steam generator unit.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO432B A heat recovery steam generator unit

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant environmental, occupational health and safety legislation and regulations
- Enterprise procedures
- Plant drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Relevant plant and equipment, its location and operating parameters
- Relevant state and territory regulations
- Electric motor types and characteristics
- Pump and compressor types and characteristics
- Valve, damper and actuator types and characteristics
- Switchgear types and characteristics
- Electrical protection types and characteristics
- Electrical principles
- Process control principles
- Plant process control systems
- a.c. generators types and characteristics
- Transformers types and characteristics
- Steam and water systems types and characteristics
- Duct burners types and characteristics
- H.R.S.G construction and principles
- Thermodynamics
- Properties of Matter
- Control and data acquisition systems;
- Mechanical and electrical supervisory,
- Alarm, protection and control equipment;
- Safe operating principles.
- The principles of control of heat transfer and rate of temperature rise during a heat recovery steam generator start up;

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REQUIRED SKILLS AND KNOWLEDGE

- Heat recovery steam generator efficiency;
- The arrangement of the heat recovery steam generator gas path and water and steam circuits;
- The heat recovery steam generator system components and their interaction with other plant and equipment external to that covered by this competency.
- Station water distribution systems;
- Fire protection control systems;
- Compressed air systems;
- Auxiliary supply systems

T2 Specific skills needed to achieve the Performance Criteria:

- Interpret plant drawings and manufacturers manuals
- Apply enterprise recording procedures;
- Identify plant status;
- Prepare plant/equipment for operation;
- Organise resources;
- Operate heat recovery steam generator plant and equipment;
- Apply temperature and pressure raising techniques and principles;
- Apply diagnostic and testing techniques;
- Identify and respond to abnormal plant operating conditions;
- Plan and prioritise work;
- Use relevant hand tools;
- Communicate effectively;
- Apply data analysis techniques and tools;

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment,

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such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also

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comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti-Discrimination legislation, regulations, polices and workplace procedure
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The knowledge and application of relevant sections of occupational, health and safety legislation; statutory legislation; enterprise/site safety procedures; enterprise/site standard operating procedures and safe operating principles; enterprise/site emergency procedures.
  - The knowledge of principles and techniques of operation of heat recovery steam generator plant and equipment together with operational testing of plant
  - The knowledge of system components and the manner in which these components interact with other plant and equipment
  - The knowledge of temperature and pressure raising requirements
  - The knowledge of the principles of heat recovery steam generator and feedwater sampling and chemical treatment
  - The ability to prepare and plan work
  - The ability to prepare plant/equipment for operation
  - The ability to operate plant/equipment in accordance with enterprise/site standard operating procedures and safe operating principles
  - The ability to analyse plant faults
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

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Context of and specific resources for assessment **9.3)**

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working in limited spaces with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with **9.5)**

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other units

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

UEPOPS411B Run up a steam turbine

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole, providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Plant and equipment may include: gas turbines; gas turbine emission control equipment; gas turbine exhaust gas control dampers; heat recovery steam generators and auxiliary plant; heat recovery steam generator supplementary duct firing equipment; fuel and fuel delivery systems; fuel management systems; flame detection equipment; steam temperature control equipment; a.c. and d.c. electrical distribution systems; electrical switchgear; electric motors; electric motor driven pumps and fans; diesel engine driven auxiliary plant; station water distribution systems; feedwater chemical dosing equipment, hydraulic power oil systems; compressed air systems; distributed control systems; supervisory, protection, alarm and control equipment.

Safety standards may include relevant sections of OHS legislation, enterprise safety rules, relevant State and federal legislation, national standards for plant and Australian standards.

Information and documentation sources may include verbal or written communications; enterprise safety rules documentation; enterprise operating instructions; dedicated computer equipment; enterprise/site standing instructions and plant notes; enterprise log books; manufacturer’s operation and maintenance manuals; and equipment and alarm manuals.

Technical and operational indicators may include stimuli (audio, smell, touch, visual), remote or local indicators and recorders, computers and alarms (visible and or audible).

Communications may be by direct personal interaction or by means of telephone, verbal or text-based telephone messaging, two way radio, pager, computer (electronic mail) and/or operating logs (written or verbal).

Appropriate personnel for consultation, giving or receiving direction may include: supervisor/team leader or equivalent, power plant operations personnel or equivalent, technical and engineering officers or equivalent, maintenance staff, other operating staff or equivalent, system controller/network controller, field operator, restricted H.V.

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RANGE STATEMENT

operators, independent generators and customers and contractor staff.

Operating environment may be remote from the plant and equipment being operated, (in cases where operation is assisted by remote indication of operating parameters and plant status), during inclement or otherwise harsh weather conditions, in hot/wet/noisy/dusty/elevated/confined or enclosed areas or during night periods.

Plant operations (systems requirements) may include:

Returns to service with the heat recovery steam generator in a cold, warm or hot condition; heat recovery steam generator internal chemical clean; raising pressure to allow steam main blow-out; raising pressure to allow safety valve setting, operational testing.

Operational tests may include:

Loss of a major auxiliary control response checks; drum level protection tests; stand-by plant “cut-in” tests; dampers/valves operating checks and pre and post start tests

Faults and abnormal operating conditions may include:

Excessively high or low steam/water drum level, loss of a major auxiliary; loss of electrical supply to switchboards, drive motors or valve actuators; feedwater chemical operating limits exceeded; automatic control loop(s) malfunctions; high temperatures on/in, heat recovery steam generator heating surfaces/tubes/headers, low temperatures on/in, heat recovery steam generator heating surfaces/tubes/headers; High/low superheater or reheater steam temperatures; high temperatures on/in: motor and/or pump bearings, lubricating oil or motor windings; heat exchange element tube leaks; excessive drum water level split; excessively high heating/cooling rates; high differential pressures on oil/air filters and strainers; failed field devices; failed/malfunctioning actuators/dampers/valves; feedwater pumps malfunctions

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations

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UEPOPS433B Operate and monitor a heat recovery steam generator unit

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to operate an in-service Heat Recover Steam Generator.

Operation of the Heat Recover Steam Generator (with or without supplementary firing) will be required through the full range of output, up to and including the maximum continuous rating.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit are subject to regulations directly related to Occupational Health and Safety. Individuals may require a licence to practise in the workplace depending on the requirements of the various State OHS regulations.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
UEPOPS333B	Operate and monitor H.R.S.G. hot gas control system
UEPOPS407B	Start and run up a gas turbine
UEPOPS433B	Start up a heat recovery steam generator unit

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 4 Writing 4 Numeracy 4

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

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Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Plan & prepare work	1.1	Safety issues are identified to comply with enterprise/site requirements.
	1.2	Work requirements are identified from relevant personnel and documentation.
	1.3	Operational checks are carried out on plant according to manufacturer’s recommendations and site requirements
	1.4	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training.
2 Operate plant	2.1	Gas turbine exhaust gas flow and power output are adjusted to achieve required steam flow and conditions, observing operating requirements.
	2.2	Supplementary Firing System (if provided) is placed into and out of service as required to maintain design steam flow and steam conditions.
	2.3	Monitoring and control of Heat Recovery Steam Generator drum level, feedwater flow, steam temperature, pressure and flow are carried out in accordance with manufacturer’s and site requirements
	2.4	Plant is operated within limits of plant design, enterprise or site requirements.

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ELEMENT		PERFORMANCE CRITERIA	
		2.5	Corrective action is taken to rectify abnormalities in accordance with manufacturer's and enterprise/site procedures.
3	Monitor Plant	3.1	Plant to be monitored is identified.
		3.2	Plant is monitored for normal operation and/or to detect deviations from required operating conditions.
		3.3	Plant integrity and personnel safety is maintained through consultation with appropriate personnel, and reference to plant technical and operational documentation
		3.4	Appropriate personnel are notified when defects are detected.
4	Analyse system faults	4.1	Causes of abnormal plant operating conditions are identified by analysing the relevant technical and operational information in a logical and sequential manner.
		4.2	Corrective action taken is in accordance with enterprise/site procedures.
5	Test plant operation	5.1	Tests are performed in accordance with defined procedures applicable to the operational test
		5.2	System and plant are observed for correct operational response
		5.3	Plant is returned to required operational status upon completion of test
		5.4	Corrective action is taken when response is not in accordance with documentation, plant integrity or personnel safety requirements
6	Complete Documentation	6.1	Documentation is updated and plant problems, movements, abnormalities and status are reported and logged in accordance with enterprise/site procedures

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired operating and monitoring a heat recovery steam generator unit.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO433B A heat recovery steam generator unit

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant environmental, occupational health and safety legislation and regulations
- Enterprise procedures
- Plant drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Relevant plant and equipment, its location and operating parameters
- Relevant state and territory regulations
- Electric motor types and characteristics
- Pump and compressor types and characteristics
- Valve, damper and actuator types and characteristics
- Switchgear types and characteristics
- Electrical protection types and characteristics
- Electrical principles
- Process control principles
- Plant process control systems
- a.c. generators types and characteristics
- Transformers types and characteristics
- Duct burners types and characteristics
- H.R.S.G construction and principles
- Thermodynamics
- Properties of Matter
- Enterprise recording procedures
- Control and data acquisition systems
- Mechanical and electrical supervisory,
- Alarm, protection and control equipment
- The principles of control of steam temperature and pressure throughout the full range of heat recovery steam generation operation up to and including maximum continuous rating

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REQUIRED SKILLS AND KNOWLEDGE

- Heat recovery steam generator efficiency
- The arrangement of the heat recovery steam generator gas path and water and steam circuits
- Fuel conditioning and supplementary firing equipment
- The heat recovery steam generator system components and their interaction with other plant and equipment external to that covered by this competency.
- a.c. and d.c. electrical distribution systems
- Station water distribution systems
- Fire protection control systems
- Compressed air systems
- Auxiliary supply systems

T2 Specific skills needed to achieve the Performance Criteria:

- Interpret plant drawings and manufacturers manuals
- Apply relevant state and territory regulations
- Apply enterprise recording procedures
- Identify plant status
- Prepare plant/equipment for operation
- Organise resources
- Operate HRSG plant and equipment
- Apply diagnostic and testing techniques
- Identify and respond to abnormal plant operating conditions
- Plan and prioritise work
- Use relevant hand tools
- Communicate effectively
- Apply data analysis techniques and tools

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of 9.1)

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Assessment

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria

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shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti-Discrimination legislation, regulations, polices and workplace procedure
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The knowledge and application of relevant sections of occupational, health and safety legislation; statutory legislation; enterprise/site safety procedures; enterprise/site standard operating procedures and safe operating principles; enterprise/site emergency procedures
  - The knowledge of principles and techniques of operation of heat recovery steam generator plant and equipment
  - The knowledge of operational testing of plant
  - The knowledge of system components and the manner in which these components interact with other plant and equipment
  - The knowledge of temperature and pressure raising requirements
  - The knowledge of the principles of heat recovery steam generator and feedwater sampling and chemical treatment
  - The ability to prepare and plan work
  - The ability to prepare plant/equipment for operation
  - The ability to operate plant/equipment in accordance with enterprise/site standard operating procedures and safe operating principles
  - The ability to analyse plant faults
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions

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incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working in limited spaces with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment

9.4)

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

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Concurrent assessment and relationship with other units **9.5)**

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

UEPOPS336B Operate and monitor a gas turbine

UEPOPS340B Operate and monitor a steam turbine

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole, providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Plant and equipment may include: gas turbines; gas turbine emission control equipment; gas turbine exhaust gas control dampers; heat recovery steam generators and auxiliary plant; heat recovery steam generator supplementary duct firing equipment; fuel delivery systems; fuel management systems; flame detection equipment; steam temperature control equipment; a.c. and d.c. electrical distribution systems; electrical switchgear; electric motors; electric motor driven pumps and fans; diesel engine driven auxiliary plant; feedwater chemical dosing equipment, station water distribution systems; hydraulic power oil systems; compressed air systems; distributed control systems; supervisory, protection, alarm and control equipment.

Safety standards may include relevant sections of Occupational Health and Safety legislation, enterprise safety rules, relevant State and federal legislation, national standards for plant and Australian standards.

Information and documentation sources may include verbal or written communications; enterprise safety rules documentation; enterprise operating instructions; computer-based and computer accessed documentation; enterprise/site standing and operating instructions; enterprise log books; manufacturer’s operation and maintenance manuals; and equipment and alarm manuals.

Technical and operational indicators may include stimuli (auditory, olfactory, tactile, visual), local indicators and recorders, computers and alarms (visible and/or audible).

Communications may be by direct personal interaction or by means of telephone, verbal or text-based telephone messaging, two way radio, pager, computer (electronic mail) and/or operating logs (written or verbal).

Appropriate personnel for consultation, giving or receiving direction may include:

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RANGE STATEMENT

supervisor/team leader or equivalent, power plant operations personnel or equivalent, technical and engineering officers or equivalent, maintenance staff, other operating staff or equivalent, system controller/network controller, field operator, restricted H.V. operators, independent generators and customers and contractor staff.

Operating environment may be remote from the plant and equipment being operated, (in cases where operation is assisted by remote indication of operating parameters and plant status), during inclement or otherwise harsh weather conditions, in hot/wet/noisy/dusty/elevated/confined or enclosed areas or during night periods.

Plant operations (systems requirements) may include:

Load changes over the full range of operation up to and including maximum continuous rating, operational testing.

Operational tests may include:

Loss of a major auxiliary control response checks; stand-by plant “cut-in” tests; dampers/valves operating checks and post start tests.

Faults and abnormal operating conditions may include:

Gas Turbine trip, excessively high or low steam/water drum level, loss of a major auxiliary; loss of electrical supply to switchboards, drive motors or valve actuators; feedwater chemical operating limits exceeded; automatic control loop(s) malfunctions; high temperatures on/in, heat recovery steam generator heating surfaces/tubes/headers, low temperatures on/in, heat recovery steam generator heating surfaces/tubes/headers; High/low superheater or reheater steam temperatures; high temperatures on/in: motor and/or pump bearings, lubricating oil or motor windings; heat exchange element tube leaks; excessive drum water level split; excessively high heating/cooling rates; loss of flame on supplementary firing combustors; fuel delivery system malfunction; fuel preparation and delivery systems fires; high differential pressures on oil/air filters and strainers; failed field devices; failed/malfunctioning actuators/dampers/valves; feedwater pumps malfunctions; heat recovery steam generator protection operation.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field 11)

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Competency Field **11)**

Operations

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UEPOPS434B Shut down a heat recovery steam generator unit

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to a shutdown of an in-service Heat Recovery Steam Generator unit.

Shut down a Heat Recovery Steam Generator unit (with or without supplementary firing) to a “Boxed up” condition will require the hot gas inlet and cold gas outlet dampers to be closed and the Steam/water drum to be pressurised at normal working level prior to a Hot /Warm restart or to be in a de-pressurised state in preparation for a short/long term outage.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit are subject to regulations directly related to Occupational Health and Safety. Individuals may require a licence to practise in the workplace depending on the requirements of the various State OHS regulations. .

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
UEPOPS333B	Operate and monitor H.R.S.G. hot gas control system
UEPOPS408B	Shut down a gas turbine

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 4 Writing 4 Numeracy 4

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

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Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Plan and prepare work	1.1	Safety issues are identified to comply with enterprise/site requirements
	1.2	Work requirements are identified from relevant personnel and documentation
	1.3	Pre-operational checks are carried out on plant according to manufacturer's recommendations and site requirements
	1.4	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2 Operate plant	2.1	Supplementary firing system is placed in and out of service in accordance with enterprise, manufacturer's and site requirements.
	2.2	Gas turbine exhaust gas flow and power output are adjusted to achieve required steam temperature, pressure and flow conditions, observing operating requirements.
	2.3	Feedwater flows are adjusted to achieve required steam conditions and demand while observing operating requirements
	2.4	Heat Recovery Steam generator drains and vents are operated in accordance with enterprise, manufacturer's and site requirements to depressurise and drain the steam/water space and heat exchange elements as required.

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ELEMENT	PERFORMANCE CRITERIA	
	2.5	Heat Recovery Steam Generator is maintained in the required out of service condition in accordance with enterprise, manufacturer's and site requirements.
	2.6	Boiler water quality is maintained within the required parameters to prevent corrosion of the drums, headers and heat exchange elements
	2.7	Plant is operated within limits of plant design, enterprise or site requirements
	2.8	Plant is monitored and observed to detect deviations from required operating conditions
	2.9	Corrective action is taken to rectify abnormalities in accordance with manufacturer's and enterprise/site procedures
3 Test plant operation	3.1	Tests are performed in accordance with defined procedures applicable to the operational test
	3.2	System and plant is observed for correct operational response
	3.3	Corrective action is taken when response is not in accordance with documentation, plant integrity or personnel safety requirements
	3.4	Plant is returned to required operational status upon completion of test
4 Analyse system faults	4.1	Causes of abnormal plant operating conditions are identified by analysing the technical and operational information in a logical and sequential manner
	4.2	Corrective action taken is in accordance with enterprise/site procedures
	4.3	Plant integrity and personnel safety is maintained through consultation with appropriate personnel, and reference to plant, technical and operational documentation
	4.4	Appropriate personnel are notified when defects are detected

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ELEMENT	PERFORMANCE CRITERIA
5 Complete documentation	5.1 Documentation is updated and plant problems, movements, abnormalities and status are reported and logged in accordance with enterprise/site procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired shutting down a heat recovery steam generator unit

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO434B Shut down a heat recovery steam generator unit

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant environmental, occupational health and safety legislation and regulations
- Enterprise procedures
- Plant drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Relevant plant and equipment, its location and operating parameters
- Relevant state and territory regulations
- Electric motor types and characteristics
- Pump and compressor types and characteristics
- Valve, damper and actuator types and characteristics
- Switchgear types and characteristics
- Electrical protection types and characteristics
- Electrical principles
- Process control principles
- Plant process control systems
- a.c. generators types and characteristics
- Transformers types and characteristics
- Duct burners types and characteristics
- H.R.S.G construction and principles

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REQUIRED SKILLS AND KNOWLEDGE

- Thermodynamics
- Properties of Matter
- Enterprise recording procedures
- Control and data acquisition systems
- Computers and software
- Mechanical and electrical supervisory,
- Alarm, protection and control equipment
- The principles of control of steam temperature and pressure throughout the full range of heat recovery steam generation operation up to and including maximum continuous rating
- Heat recovery steam generator efficiency
- Principles of heat recovery steam generator steam and feedwater chemical treatment
- The arrangement of the heat recovery steam generator gas path and water and steam circuits
- Fuel conditioning and supplementary firing equipment
- The heat recovery steam generator system components and their interaction with other plant and equipment external to that covered by this competency.
- a.c. and d.c. electrical distribution systems
- Station water distribution systems
- Fire protection control systems
- Compressed air systems
- Auxiliary supply systems

T2 Specific skills needed to achieve the Performance Criteria:

- Interpret plant drawings and manufacturers manuals
- Apply relevant state and territory regulations
- Apply enterprise recording procedures
- Identify plant status
- Prepare plant/equipment for operation
- Organise resources
- Operate HRSG plant and equipment
- Apply temperature and pressure reducing techniques and principles
- Apply diagnostic and testing techniques
- Identify and respond to abnormal plant operating conditions
- Plan and prioritise work
- Use relevant hand tools
- Communicate effectively
- Apply data analysis techniques and tools

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Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be ‘rich’ in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its ‘richness’. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

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Critical aspects of evidence required to demonstrate competency in this unit **9.2)**

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti-Discrimination legislation, regulations, polices and workplace procedure
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The knowledge and application of relevant sections of occupational, health and safety legislation; statutory legislation; enterprise/site safety procedures; enterprise/site standard operating procedures and safe operating principles; enterprise/site emergency procedures
  - The knowledge of principles and techniques of operation of heat recovery steam generator plant and equipment
  - The knowledge of operational testing of plant
  - The knowledge of system components and the manner in which these components interact with other plant and equipment

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- The knowledge of cooling and de-pressurising requirements
- The knowledge of the principles of heat recovery steam generator and feedwater sampling and chemical treatment
- The ability to prepare and plan work
- The ability to prepare plant/equipment for operation
- The ability to operate plant/equipment in accordance with enterprise/site standard operating procedures and safe operating principles
- The ability to analyse plant faults
- Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment **9.3)**

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working in limited spaces with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00

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Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

UEPOPS341B Shut down a steam turbine

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole, providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Plant and equipment may include: gas turbines; gas turbine emission control equipment; gas turbine exhaust gas control dampers; heat recovery steam generators and auxiliary plant; heat recovery steam generator supplementary duct firing equipment; fuel delivery systems; fuel management systems; flame detection equipment; steam temperature control equipment; a.c. and d.c. electrical distribution systems; electrical switchgear; electric motors; electric motor driven pumps and fans; diesel engine driven auxiliary plant; feedwater chemical dosing equipment, station water distribution systems; hydraulic power oil systems; compressed air systems; distributed control systems; supervisory, protection, alarm and control equipment.

Safety standards may include relevant sections of Occupational Health and Safety legislation, enterprise safety rules, relevant State and federal legislation, national standards for plant and Australian standards.

Information and documentation sources may include verbal or written

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RANGE STATEMENT

communications; enterprise safety rules documentation; enterprise operating instructions; computer-based and computer accessed documentation; enterprise/site standing and operating instructions; enterprise log books; manufacturer's operation and maintenance manuals; and equipment and alarm manuals.

Technical and operational indicators may include stimuli (auditory, olfactory, tactile, visual), local indicators and recorders, computers and alarms (visible and/or audible).

Communications may be by direct personal interaction or by means of telephone, verbal or text-based telephone messaging, two way radio, pager, computer (electronic mail) and/or operating logs (written or verbal).

Appropriate personnel for consultation, giving or receiving direction may include: supervisor/team leader or equivalent, power plant operations personnel or equivalent, technical and engineering officers or equivalent, maintenance staff, other operating staff or equivalent, system controller/network controller, field operator, restricted H.V. operators, independent generators and customers and contractor staff.

Operating environment may be remote from the plant and equipment being operated, (in cases where operation is assisted by remote indication of operating parameters and plant status), during inclement or otherwise harsh weather conditions, in hot/wet/noisy/dusty/elevated/confined or enclosed areas or during night periods.

Plant operations (systems requirements) may include: HRSG emergency trip; HRSG shutdown, with or without turbine bypass or by using forced cooling procedures; shutdown to "boxed up" condition with the flue gas circuit closed at hot gas inlet and cold gas outlet and steam/water circuit pressurised; shutdown to "depressurised" condition with the flue gas circuit open at hot gas inlet and cold gas outlet and steam/water circuit de-pressurised and/or drained.

Faults and abnormal operating conditions may include: Gas Turbine trip, excessively high or low steam/water drum level, loss of a major auxiliary; loss of electrical supply to switchboards, drive motors or valve actuators; feedwater chemical operating limits exceeded; automatic control loop(s) malfunctions; high temperatures on/in, heat recovery steam generator heating surfaces/tubes/headers, low temperatures on/in, heat recovery steam generator heating surfaces/tubes/headers; High/low superheater or reheater steam temperatures; high temperatures on/in: motor and/or pump bearings, lubricating oil or motor windings; heat exchange element tube leaks; excessive drum water level split; excessively high heating/cooling rates; loss of flame on supplementary firing combustors; fuel delivery system malfunction; fuel preparation and delivery systems fires; high differential pressures on oil/air filters and strainers; failed field devices; failed/malfunctioning actuators/dampers/valves; feedwater pumps malfunctions; heat recovery steam generator protection operation.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

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Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations

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UEPOPS435B Operate and monitor flue gas (NOx) mitigation systems

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required for the operation, inspection and monitoring of flue gas NOx mitigation systems.

Flue gas (NOx) mitigation systems are those associated with coal, gas, oil and biomass fired thermal power stations, and oil and/or gas fired gas turbine power stations and combined cycle power stations

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 4 Writing 4 Numeracy 4

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the

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Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Plan and prepare work	1.1	Safety issues are identified to comply with enterprise/site and legislative requirements
	1.2	Work requirements are identified from relevant personnel and documentation
	1.3	Localised plant inspection, pre-operational checks and field preparations for service are carried out in accordance with manufacturer's and enterprise/site procedures
	1.4	Plant operational pre-requisites are established in accordance with manufacturer's and enterprise/site procedures
	1.5	Sequence for recommissioning of plant is determined to suit existing circumstances in accordance with enterprise/site requirements
	1.6	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2 Operate plant	2.1	Plant is operated in accordance with enterprise and manufacturer's operating procedures
	2.2	Plant is monitored and observed to detect deviations from normal operating conditions
	2.3	Corrective actions taken or reported, to rectify abnormalities, are in accordance with industry standards and site requirements
3 Test plant operation	3.1	Tests are performed in accordance with defined procedures applicable to the operational test
	3.2	Plant is observed for correct operational response
	3.3	Corrective action is taken when response is not

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ELEMENT		PERFORMANCE CRITERIA	
			in accordance with documentation, plant integrity or personnel safety requirements
		3.4	Plant is returned to required operational status upon completion of test
4	Analyse plant faults	4.1	Causes of abnormal plant operating conditions are identified by analysing the technical and operational information in a logical and sequential manner
		4.2	Corrective action taken is in accordance with enterprise/site procedures
		4.3	Plant integrity and personnel safety is maintained through consultation with appropriate personnel, and with reference to plant, technical and operational documentation
5	Monitor and inspect plant	5.1	Plant to be monitored/inspected is physically identified
		5.2	Plant is monitored/inspected for normal operation or to detect deviations
		5.3	Corrective action taken is in accordance with enterprise/site procedures
		5.4	Appropriate personnel are notified when defects are detected
6	Complete documentation	6.1	Documentation is updated and plant problems, movements and abnormalities and status are reported and logged in accordance with enterprise/site procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired operating and monitoring flue gas (NOx) mitigation systems.

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REQUIRED SKILLS AND KNOWLEDGE

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO435B Flue gas (NOx) mitigation systems

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant environmental, occupational health and safety legislation and regulations
- Enterprise procedures
- Plant drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Relevant plant and equipment, its location and operating parameters
- Relevant state and territory regulations
- Electric motor types and characteristics
- Pump and compressor types and characteristics
- Valve, damper and actuator types and characteristics
- Switchgear types and characteristics
- Electrical protection types and characteristics
- Electrical principles
- Transformers types and characteristics
- Water treatment plants types and characteristics
- Types of air pollution
- Gaseous emission removal equipment, types and characteristics
- NOx control equipment, types and characteristics
- Combustion principles
- Fuels, types and properties
- Enterprise recording procedures
- Control and data acquisition systems
- Alarm, protection and control equipment
- NOx emission control system components and their interaction with other plant and equipment external to that covered by this competency
- a.c. and d.c. electrical distribution systems
- Station water distribution systems
- Fire protection control systems
- Compressed air systems
- Auxiliary supply systems.

T2 Specific skills needed to achieve the Performance Criteria:

- Interpret plant drawings and manufacturers manuals
- Apply relevant state and territory regulations

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REQUIRED SKILLS AND KNOWLEDGE

- Apply enterprise recording procedures
- Communicate effectively
- Plan and prioritise work
- Organise resources
- Identify plant status
- Prepare plant/equipment for operation
- Use relevant hand tools
- Operate NOx emission control plant and equipment
- Apply diagnostic and testing techniques
- Identify and respond to abnormal plant operating conditions
- Apply data analysis techniques and tools

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the

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most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential

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Knowledge and Associated Skills of this unit
- Demonstrate an appropriate level of employability skills
- Conduct work observing the relevant Anti-Discrimination legislation, regulations, polices and workplace procedure

- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The knowledge and application of relevant sections of occupational, health and safety legislation; statutory legislation; enterprise/site safety procedures; enterprise/site standard operating procedures and safe operating principles; enterprise/site emergency procedures
  - The knowledge of the principles of NOx generation during the combustion process within fossil fuelled boilers and gas turbines
  - The knowledge of principles and techniques of operation of NOx emission control plant and equipment
  - The knowledge of system components and the manner in which these components interact with other plant and equipment
  - The knowledge of operational testing of plant
  - The ability to prepare and plan work
  - The ability to prepare plant/equipment for operation
  - The ability to operate and monitor plant/equipment in accordance with enterprise/site standard operating procedures and safe operating principles
  - The ability to analyse plant faults
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or

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simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working in limited spaces with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines..

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

UEPOPS407B Start and Run up a Gas Turbine

UEPOPS409B Start Up a Boiler Unit

UEPOPS336B Operate and Monitor a Gas Turbine

UEPOPS339B Operate and Monitor a Gas Turbine

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Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole, providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Plant and equipment may include: flue gas emission control systems associated with coal, gas, oil and biomass fired thermal power stations and oil and gas fired gas turbine and combined cycle power stations; a.c. and d.c. electrical distribution systems; electrical switchgear; electric motors; electric motor driven pumps and fans; valves, dampers and actuators (manual, electric, hydraulic and pneumatic); flue and/or exhaust gas temperature control equipment; storage hoppers and material conveying equipment; lubrication systems; station water distribution systems; hydraulic power oil systems; compressed air systems; distributed control systems; supervisory, protection, alarm and control equipment.

Safety standards may include relevant sections of Occupational Health and Safety legislation, enterprise safety rules, relevant State and federal legislation, national standards for plant and Australian standards.

Information and documentation sources may include verbal or written communications; enterprise safety rules documentation; enterprise operating instructions; computer-based and computer accessed documentation; enterprise/site standing and operating instructions; enterprise log books; manufacturer’s operation and maintenance manuals; and equipment and alarm manuals.

Technical and operational indicators may include stimuli (auditory, olfactory, tactile, visual), local indicators and recorders, computers and alarms (visible and/or audible).

Communications may be by direct personal interaction or by means of telephone, verbal or text-based telephone messaging, two way radio, pager, computer (electronic mail) and/or operating logs (written or verbal).

Appropriate personnel for consultation, giving or receiving direction may include: supervisor/team leader or equivalent, power plant operations personnel or equivalent, technical and engineering officers or equivalent, maintenance staff, other operating staff or equivalent, system controller/network controller, field operator, restricted H.V. operators, independent generators and customers and contractor staff.

Operating environment may be remote from the plant and equipment being operated, (in cases where operation is assisted by remote indication of operating parameters and plant status), during inclement or otherwise harsh weather conditions, in hot, wet, noisy, dusty, elevated, confined or enclosed areas or during night periods.

Plant operations (systems requirements) may include:

Returns to service with the heat recovery steam generator in a cold, warm or hot condition; heat recovery steam generator internal chemical clean; raising pressure to allow steam main blow-out; raising pressure to allow safety valve setting, operational testing.

Operational tests may include:

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RANGE STATEMENT

System calibration tests, stand-by plant “cut-in” tests; dampers/valves operating checks and pre and post start tests; performance tests and alarm initiation tests

Faults and abnormal operating conditions may include:

Loss of electrical supply to switchboards, drive motors or valve actuators; controlled emissions limits exceeded; automatic control loop(s) malfunctions; high flue gas or exhaust gas temperatures; high temperatures on/in: motor and/or pump bearings, lubricating oil or motor windings; high differential pressures on oil/air filters and strainers; failed field devices; failed/malfunctioning actuators/dampers/valves; emission control system protection operation.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations

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UEPOPS437B Manage system re-start

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This competency unit deals with the skills and knowledge required to manage a system re-start after the islanding or shut down of a system/network.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

Pre-Requisites

Prerequisite Unit(s) **4)**

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Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 4 Writing 4 Numeracy 4

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT		PERFORMANCE CRITERIA	
1	Identify cause	1.1	Probable implications are identified and assessed in accordance with enterprise procedures
		1.2	Secondary threats to situation are identified and monitored in accordance with enterprise procedures
		1.3	The system configuration and/or generation capability is evaluated in accordance with enterprise procedures
		1.5	External information is sort, collated and assessed in accordance with enterprise procedures
		1.6	Probable cause of shutdown is identified from available information and resources
		1.7	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
		1.8	Communication with appropriate key stakeholders is established in accordance with enterprise procedures
		1.9	Communications with relevant personnel is established in accordance with enterprise procedures
		1.10	Team roles, both internal and external, are identified and conveyed to appropriate personnel in accordance with enterprise procedures
2	Restore system/network/generation	2.1	Response is managed in accordance with enterprise/site requirements and allowances for personnel/equipment limitations are made
		2.2	Responses are prioritised in accordance with enterprise procedures
		2.3	Contingency/re-start plans are actioned in accordance with enterprise/site policy and

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ELEMENT	PERFORMANCE CRITERIA	
		procedure
	2.4	Additional resources are coordinated and directed in accordance with enterprise procedures
	2.5	Re-start plans are monitored, evaluated and adjusted as necessary in accordance with enterprise procedures
3 Document	3.1	Equipment failure/problems are recorded and processed in accordance with enterprise procedures
	3.2	Feedback from stakeholders is recorded and in accordance with enterprise procedures
	3.3	Required reports and findings are generated and distributed to appropriate personnel in accordance with enterprise procedures
	3.4	Alternative contingencies/re-start plans and/or recommendations are communicated to appropriate personnel in accordance with enterprise procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired managing system re-starts.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO437B System re-start

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant environmental, occupational health and safety legislation and regulations
- Enterprise procedures

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REQUIRED SKILLS AND KNOWLEDGE

- Plant drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Relevant plant and equipment, its location and operating parameters
- Relevant state and territory regulations
- Switchgear types and characteristics
- Electrical protection types and characteristics
- Electrical principles
- a.c. generators types and characteristics
- Transformers types and characteristics
- Electrical system/network. types and characteristics
- Plant status
- Environmental awareness
- Enterprise recording procedures
- Equipment starting pre requisites
- Supervisory, alarm, protection and control equipment
- Auxiliary plant and plant operation
- Computers and software
- External authorities/bodies role
- Communication equipment

T2 Specific skills needed to achieve the Performance Criteria:

- Interpret plant drawings and manufacturers manuals
- Apply relevant state and territory regulations
- Apply enterprise recording procedures
- Locate relevant plant and equipment
- Operate plant within design parameters
- Identify plant status
- Communicate effectively
- Apply diagnostic techniques
- Apply data analysis techniques and tools
- Recognise abnormal plant operating conditions
- Apply or determine appropriate corrective actions required
- Plan and prioritise work
- Maintain generator unit integrity
- Interpret remote indication of plant status and condition
- Delegate to and manage staff
- Apply stress management techniques.

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Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be ‘rich’ in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its ‘richness’. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

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Critical aspects of evidence required to demonstrate competency in this unit **9.2)**

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement OHS workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti-Discrimination legislation, regulations, polices and workplace procedure
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - The knowledge of the roles of external authorities/bodies
  - The ability to establish and control emergency situations in operating the network system
  - The ability to apply tactical decision making techniques in operating the network system
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above

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listed items.

Context of and specific resources for assessment **9.3)**

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working in limited spaces with different types of plant and equipment and different structural/ construction types and methods and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with **9.5)**

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other units

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole, providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Safety standards may include relevant sections of Occupational Health and Safety legislation, relevant State and federal legislation, national standards for plant and enterprise safety rules.

Information and documentation sources may include verbal or written communications; enterprise safety rules documentation; enterprise operating instructions; dedicated computer equipment; enterprise/site standing and operating instructions; enterprise log books; manufacturer's operation and maintenance manuals; equipment and alarm manuals and external stake holder agreements.

Communications may be by means of telephone, two way radio, pager, computer (electronic mail), operating logs (written or verbal) and intercoms.

Appropriate personnel for consultation, to give or receive direction may include supervisor/team leader or equivalent, power plant operations personnel or equivalent, technical and engineering officers or equivalent, maintenance staff, power plant operations personnel, police, fire brigade, ambulance, emergency services, interconnected equipment personnel, public relations, management and system/network controllers.

Operating environment may be remote from plant and equipment being operated (operation is assisted by remote indicators of plant status and other parameters monitored) during inclement or otherwise harsh weather conditions, in wet/ noisy/dusty areas, during night periods, continuous operation, during periods of stress, fatigue, work pressures, external influence (plant and people) and during high level intense work environment.

Types of incidents may include blackout, interconnected/isolated power system potential power system threat, disasters, accident, life threatening situations, generation plant and auxiliary plant faults/failures, system blacks, cyclone, multiple faults, floods, secondary threats, high winds and extreme electrical storms.

Key indicators are voltage, current, reactive power flows, load, equipment, loading

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RANGE STATEMENT

limits, system node points and appropriate external indicators, e.g. radar.

System implications are machine and system stability, transmission line and transformer overloading, correct tap changer position, protection settings, voltage transformer selection, synchronising, generator stability limits, prime mover capability constraints, required load shedding selected and capacitor/confessor bank selection.

System conditions may be: voltage profiles, spare plant, generation/transmission capability limits, variation from normal trends and switching.

Documentation may include policy, procedure, standard operating instructions, contingency plans and emergency switching programs.

Liaison with key stakeholders may be system/network controllers/coordinators, oncoming shift change, field operators, support staff, asset centres, patrolmen, customers, other government bodies, co-generation authorities, generation plant operators, on call staff, police, fire, emergency services, private systems and independent power producers.

Post incident debrief may be probable fault/failure cause, strategic/contingency plan, environmental implications, economic factors, policy, procedure, training, safety factors and emergency switching programs.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations

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UEPOPS439B Plan and organise work

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to undertake the planning and organising of tasks to be undertaken by the team.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

Pre-Requisites

Prerequisite Unit(s) **4)**

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Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 4 Writing 4 Numeracy 4

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and prepare for work	1.1 Work requirements are identified from request/work orders or equivalent and clarified/confirmed with appropriate parties or by site inspection
	1.2 Occupational Health and Safety standards, statutory requirements, relevant Australian standards, codes of practice, manufacturer's specifications, environmental requirements and enterprise procedures are identified, applied and monitored throughout the work procedure
	1.3 Materials, equipment and resources required to satisfy job plan are identified, requisitioned, obtained and inspected for compliance with job specifications
	1.4 Coordination requirements, including requests for isolations, are resolved with others involved or affected by the work in accordance with enterprise/site requirements
	1.5 Work is planned in accordance with job requirements, appropriate plans, drawings and standards and, if necessary, by site inspection
	1.6 Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2 Coordinate work	2.1 Permits are requested/received, interpreted, clarified and signed and conveyed to appropriate parties in accordance with enterprise procedures and job requirements
	2.2 Tasks are assigned and monitored to ensure compliance with plans, work requirements and enterprise procedures
	2.3 Work is conducted in accordance with sustainable energy principles
	2.4 Provision for the re-cycling or re-use of

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ELEMENT	PERFORMANCE CRITERIA	
		materials is undertaken where possible
	2.5	Job requirements are modified to meet unforeseen requirements, resources reallocated/rescheduled and the extent of change communicated promptly to all those affected in accordance with job requirements
3 Complete the work	3.1	Finalisation of work and restoration of the site is monitored and ensured in accordance with enterprise procedures and job requirements
	3.2	Permits are signed off and appropriate parties are notified of work completion in accordance with enterprise procedures and job requirements
	3.3	Job records, costing data and necessary reports are prepared/finalised in accordance with enterprise procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired planning and organising work.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO439B Plan and organise work

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant environmental, occupational health and safety legislation and regulations
- Enterprise procedures
- Plant drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Relevant plant and equipment, its location and operating parameters
- Resource planning techniques
- Interpersonal skills techniques

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REQUIRED SKILLS AND KNOWLEDGE

- Team goals setting techniques
- Performance management techniques
- Stakeholder management techniques
- Time management techniques
- Leadership techniques
- Enterprise permit to work procedures
- Enterprise recording procedures
- Appropriate tools, equipment and materials required to do the work
- Team communication process

T2 Specific skills needed to achieve the Performance Criteria:

- Interpret plant drawings and manufacturers manuals
- Apply resource planning techniques
- Apply interpersonal skills techniques
- Apply team goals setting techniques
- Apply performance management techniques
- Coordinate/sequence work requirements
- Assess team capabilities and capacities
- Review job progress against agreed goals
- Modify team work plan
- Communicate information to stakeholders
- Prepare and interpret work procedures
- Estimate materials and resource requirements
- Monitor team performance
- Apply data analysis techniques and tools.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

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Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with

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the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti-Discrimination legislation, regulations, polices and workplace procedure
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The knowledge and application of relevant sections of: OHS legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Developing and implementing work plans
  - Coordination techniques
  - Work completion details
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or

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simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working in limited spaces with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

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RANGE STATEMENT

10) This relates to the competency standard unit as a whole, providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Coordination issues may include team briefing, public notification, notice of intended work, safety coordination, fuel and rest stops, accommodation, liaison with other divisions/clients and preparing work plan.

Resources may include materials, plant, equipment and personnel.

Job records may include contract history file, plans, time sheets/cards and daily diary.

Sustainable energy and principles refers to or includes those factors defined in the glossary under ‘environment’.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations

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UEPOPS440B Coordinate team activities

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to direct and coordinate team activities required to achieve agreed goals.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

Pre-Requisites

Prerequisite Unit(s) **4)**

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Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 4 Writing 4 Numeracy 4

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Prepare for teamwork	1.1	Occupational Health and Safety standards, statutory requirements, relevant Australian standards, codes of practice, environmental requirements and enterprise procedures are identified, applied and monitored throughout the teams activities
	1.2	Work of the team is planned to ensure their safety, that of the public, and the security of plant and equipment
	1.3	Hazards, or incidents, are identified, investigated and remedial action planned and implemented in accordance with enterprise, site and legislative requirements
	1.4	Communication requirements are identified in accordance with work requirements
	1.5	Communication and information systems are accessed and applied in accordance with work requirements
	1.6	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2 Coordinate teamwork	2.1	Site and/or enterprise goals and the contributions to be made by team members are identified, interpreted and clarified
	2.2	The need for cooperative interaction between team members is fostered to ensure balanced participation in accordance with work requirements
	2.3	Defined roles and strengths of team members are identified and utilised to optimise efficiency in accordance with work requirements
	2.4	Ground rules and work plans for the team are developed, revised and requirements to make changes are made through consultative processes

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ELEMENT	PERFORMANCE CRITERIA	
	2.5	Team goals and unity are positively promoted to clients and team members
	2.6	Proposals for team improvements, including flexibility of functions are initiated and/or encouraged from team members
	2.7	Causes of disharmony and other barriers to achievement are identified and resolved or referred to appropriate parties
3 Conduct team meetings	3.1	Preparatory activity is completed including clarification of meeting objectives and research and preparation of views
	3.2	Meeting procedures and objectives are identified and conveyed to team members in a logical and orderly manner
	3.3	Formal presentations are undertaken to enhance communication and accordance with enterprise requirements
	3.4	Points of view of team members, whether in agreement or dissent, are given a fair hearing
	3.5	Every effort is made to encourage all team members to actively take part in team meetings

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired co-ordinating team activities.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO440B Team activities

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

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REQUIRED SKILLS AND KNOWLEDGE

- Relevant environmental, occupational health and safety legislation and regulations
- Enterprise procedures
- Plant drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Relevant plant and equipment, its location and operating parameters
- Interpersonal skills techniques
- Team goals setting techniques
- Performance management techniques
- Stakeholder management techniques
- Time management techniques
- Leadership techniques
- Meeting leadership techniques
- Competency identification of team members
- Dispute resolution procedures
- Meeting procedures
- Communication procedures

T2 Specific skills needed to achieve the Performance Criteria:

- Interpret plant drawings and manufacturers manuals
- Apply interpersonal skills techniques
- Apply team goals setting techniques
- Apply performance management techniques
- Promote team unity
- Communicate effectively with team and others
- Develop work plan
- Maximise and utilise team potential
- Identify skill shortages and training needs of team
- Resolve differences within the team
- Monitor team activities
- Provide team support
- Promote personal and personnel safety awareness
- Apply data analysis techniques and tools.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of

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EVIDENCE GUIDE

the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment 9.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be ‘rich’ in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its ‘richness’. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects 9.2)

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of evidence required to demonstrate competency in this unit

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti-Discrimination legislation, regulations, polices and workplace procedure
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Preparing work for team
  - Coordinating team work
  - Conducting team meetings
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

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Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working in limited spaces with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment

9.4)

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

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There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole, providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Team is a generic term used to describe groups, crews, gangs, shifts, or other industrially and historically acceptable terms.

Communication systems may include previous shift reporting, written and/or verbal instructions and operating procedures, electronic mail, telephones, pagers, facsimiles and two-way radios.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations

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UEPOPS441B Operate and monitor system equipment

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with skills and knowledge to operate, monitor and control of H.V. apparatus on the system, via SCADA control.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

Pre-Requisites

Prerequisite Unit(s) **4)**

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Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 4 Writing 4 Numeracy 4

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT		PERFORMANCE CRITERIA	
1	Plan and prepare work	1.1	Safety issues are identified in accordance with enterprise/system requirements
		1.2	System requirements are identified from relevant personnel and documentation
		1.3	System and associated equipment operational pre-requisites are identified and established in accordance with manufacturers and/or enterprise/site procedures
		1.4	Sequence for recommissioning of equipment is identified and determined in accordance with enterprise/system requirements
		1.5	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2	Operate system equipment	2.1	The equipment is operated in accordance with enterprise/system procedures/programs
		2.2	Load shedding requirements are identified, selected and monitored during equipment operations to ensure system integrity
		2.3	Operations are carried out in consultation with appropriate personnel in accordance with enterprise/site requirements
3	Monitor system equipment	3.1	Voltage and current requirements are assessed, evaluated and controlled to maintain system integrity and stability
		3.2	Equipment is monitored for normal operations or to detect deviations in accordance with system procedures
		3.3	Corrective actions to rectify abnormalities are undertaken in accordance with system procedures
		3.4	Appropriate personnel are notified when defects

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ELEMENT		PERFORMANCE CRITERIA	
			and/or abnormal operating conditions are detected in accordance with operating procedures
4	Analyse equipment faults	4.1	Cause of equipment operating faults are identified by analysing the technical and operational information in a logical and sequential manner
		4.2	Operation of protection system is identified and assessed to evaluate the nature and cause of fault conditions
		4.3	Communication is established with other authorities and/or key stakeholders to identify nature/source of equipment fault/ failure
		4.4	Corrective action taken is in accordance with enterprise/site procedures
		4.5	Network/system integrity and personnel safety are maintained through consultation with appropriate personnel, and reference to plant, technical and operational documentation and contingency plans
5	Complete documentation	5.1	Documentation is updated and maintained and equipment problems, movements, abnormalities and status are reported and logged in accordance with enterprise/site procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired operating and monitoring system equipment.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

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REQUIRED SKILLS AND KNOWLEDGE

KS01-PO441B System equipment

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant environmental, occupational health and safety legislation and regulations
- Enterprise procedures
- Plant drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Relevant plant and equipment, its location and operating parameters
- Relevant state and territory regulations
- Switchgear types and characteristics
- Electrical protection types and characteristics
- Electrical principles
- Transformers types and characteristics
- Equipment status
- Enterprise recording procedures
- Control and data acquisition systems
- Supervisory, alarm, protection and control equipment

T2 Specific skills needed to achieve the Performance Criteria:

- Interpret plant drawings and manufacturers manuals
- Apply relevant state and territory regulations
- Apply enterprise recording procedures
- Operate screen based equipment
- Identify equipment status
- Plan and prioritise work
- Communicate effectively
- Apply data analysis techniques and tools
- Identify and respond to abnormal equipment operating conditions

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in

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EVIDENCE GUIDE

accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be ‘rich’ in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its ‘richness’. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in **9.2)**

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this unit

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti-Discrimination legislation, regulations, polices and workplace procedure
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures, Planning and preparing for work, Operating system equipment, Monitoring system equipment, Analysing equipment faults, Knowledge of implications of actions
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment **9.3)**

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This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working in limited spaces with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

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Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole, providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Equipment may include machines, circuit breakers, tap changers, protection settings, capacitor/condenser banks, switch gear, generators and transformers.

Safety standards may include relevant sections of Occupational Health and Safety legislation, enterprise safety rules, relevant State and federal legislation, national standards for plant and environmental legislation.

Information and documentation sources may include verbal or written communications; enterprise safety rules documentation; enterprise operating instructions; dedicated computer equipment; enterprise/site standing and operating instructions; enterprise log books; manufacturer's operation and maintenance manuals; and equipment and alarm manuals.

Technical and operational indicators may include stimuli, local indicators and recorders, computers and alarms (visible and or audible).

Communications may be by means of telephone, two way radio, pager, public address system, computer (electronic mail) and operating log (written or verbal).

Appropriate personnel to consult, give or receive direction may include supervisor/team leader or equivalent, power plant operations personnel or equivalent, technical and engineering officers or equivalent, maintenance staff, other operating staff or equivalent, system controller/network controller, field operator and restricted HV operators.

Operations may be continuous operation or during inclement or otherwise harsh weather conditions or during night periods.

Faults and abnormal operating conditions may include control equipment failure/malfunctions, loss of electrical supply to plant and equipment, loss of transmission components, system limitations due to location, weather conditions, natural disasters, accidents, temperature and power swings.

Key indicators may include voltage, current, reactive power flows, load, equipment, loading limits and system node points.

Voltage control may include synchronous compensatory, generation VAR output, capacitor/condenser, tap changers and system configuration.

System integrity may include machine and system instability, transmission line and transformer overloading, incorrect tap changer position, protection settings, voltage transformer selection, synchronising, required load shedding and capacitor/condenser

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RANGE STATEMENT

bank selection.

Operational pre-requisites may include switching programmes, pre-operational checks and plant status.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations

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UEPOPS442B Monitor and coordinate the operation of a combined cycle gas turbine unit

Modification History

Release	Action	Core/Elective	Details	Points
2	Edit		Correct pre-requisite code to reflect title UEPOPS340B Operate and monitor a steam turbine	

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to simultaneously operate and monitor a Combined Cycle Plant for the safe and effective management of energy production to meet demand on combined cycle gas turbine electricity generating unit.

Application of the Unit

Application of the Unit **2)**

A Combined Cycle Plant consisting of a Gas Turbine and associated generator, Heat Recovery Steam Generator, Steam Turbine and associated generator.

This unit is intended to augment formally acquired competencies.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit are subject

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License to practice **3)**

to regulations directly related to Occupational Health and Safety. Individuals may require a licence to practise in the workplace depending on the requirements of the various State OHS regulations.

Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
UEPOPS314B	Operate and monitor fuel firing plant (gas or oil)
UEPOPS333B	Operate and monitor H.R.S.G. hot gas control system
UEPOPS336B	Operate and monitor gas turbine unit
UEPOPS340B	Operate and monitor a steam turbine

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 4 Writing 4 Numeracy 4

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Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT		PERFORMANCE CRITERIA	
1	Plan for plant operation	1.1	Safety issues are identified to comply with enterprise/site requirements
		1.2	Work, plant and resource requirements are identified from relevant information and documentation
		1.3	Pre-operational checks are carried out in accordance with enterprise and site requirements
2	Operate Heat Recovery Steam Generator	2.1	Gas turbine exhaust gas flow and power output are adjusted to achieve required steam flow and conditions, observing operating requirements
		2.2	Supplementary Firing System (if provided) is placed into and out of service as required to maintain design steam flow and steam conditions.

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ELEMENT	PERFORMANCE CRITERIA	
	2.3	Plant is operated within limits of plant design, enterprise or site requirements
	2.4	Plant is operated, monitored and observed to detect deviations from required operating conditions
	2.5	Corrective action is taken to rectify abnormalities in accordance with manufacturer's and enterprise/site procedures
3 Operate generator and excitation system	3.1	System is operated in accordance with enterprise/site and manufacturer's operating procedures
	3.2	Synchronising requirements are assessed, evaluated and achieved to ensure machine/system stability during synchronising
	3.3	System is monitored and observed to detect deviations from normal operating conditions
	3.4	Corrective actions are taken to rectify abnormalities in accordance with manufacturer's and enterprise/site procedures
	3.5	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
4 Control generation of electrical energy	4.1	Generator output is adjusted to meet demand whilst observing operating requirements
	4.2	Reactive power generation and voltage regulation requirements are assessed and the system is controlled to achieve the desired output
	4.3	Generator stabilities and operating limits are assessed and the system is controlled to maintain those limits in accordance with enterprise/site and manufacturer's procedures
	4.4	Generator cooling systems and limits are monitored and assessed, excitation system is controlled to maintain those limits in accordance

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ELEMENT	PERFORMANCE CRITERIA	
		with enterprise/site and manufacturer's procedures
5 Coordinate unit operations	5.1	Systems are operated to meet requirements whilst observing plant limitations
	5.2	Systems are monitored and observed to detect deviations from normal operating conditions
	5.3	Causes of abnormal operating conditions are identified by analysing the technical and operational information
	5.4	Corrective actions taken to rectify system abnormalities are in accordance with enterprise and site requirements
	5.5	System integrity, personnel safety and continuity of supply are maintained throughout
	5.6.	Consultation with appropriate personnel is undertaken as required in accordance with site requirements
	5.7	Systems are operated at optimum efficiency
6 Monitor system/plant	6.1	System/plant to be monitored is physically identified
	6.2	System/plant is monitored for normal operation or to detect deviations
	6.3	Corrective action taken is in accordance with enterprise/site procedures
	6.4	Appropriate personnel are notified when defects and abnormal operating conditions are detected
7 Test system/plant operation	7.1	Tests are performed in accordance with defined procedures applicable to the operational test
	7.2	System/plant is observed for correct operational response
	7.3	Correct action is taken when response is not in accordance with documentation, plant/system integrity or personnel safety requirements

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ELEMENT		PERFORMANCE CRITERIA	
		7.4	System/plant is returned to required operational status upon completion of test
8	Analyse system/plant faults	8.1	Causes of abnormal system operating conditions are identified by analysing the technical and operational information in a logical and sequential manner
		8.2	Actions necessary to rectify fault are correctly determined
		8.3	System/plant integrity and personnel safety are maintained through consultation with appropriate personnel, and reference to plant, technical and operational documentation
		8.4	Appropriate personnel are arranged for local investigation of identified operational abnormalities
9	Complete documentation	9.1	Documentation is updated and plant problems, movements, abnormalities and status are reported and logged in accordance with enterprise/site procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired monitoring and coordinating the operation of a combined cycle gas turbine unit.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO442B Operation of a combined cycle gas turbine unit

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant environmental, occupational health and safety legislation and regulations

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REQUIRED SKILLS AND KNOWLEDGE

- Enterprise procedures
- Plant drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Relevant plant and equipment, its location and operating parameters
- Relevant state and territory regulations
- Electric motor types and characteristics
- Pump and compressor types and characteristics
- Valve, damper and actuator types and characteristics
- Switchgear types and characteristics
- Electrical protection types and characteristics
- Electrical principles
- Process control principles
- Plant process control systems
- Fan types and characteristics
- a.c. generators types and characteristics
- Transformers types and characteristics
- Generator excitation and cooling systems, types and characteristics
- Gas turbine principle of operation
- Gas turbine air intake, types and characteristics
- Gas turbine air inlet cooling and heating systems, types and characteristics
- Gas turbine exhaust, types and characteristics
- Gas turbine lubrication systems, types and characteristics
- Gas turbine control oil systems, types and characteristics
- Gas turbine water wash systems, types and characteristics
- Gas turbine cooling systems, types and characteristics
- Gas turbine water/steam injection systems, types and characteristics
- Gas turbine combustion system, types and characteristics
- The principles of control of steam temperature and pressure throughout the full range of heat recovery steam generation operation up to and including maximum continuous rating
- Heat recovery steam generator efficiency
- The arrangement of the heat recovery steam generator gas path and water and steam circuits
- Fuel conditioning and supplementary firing equipment
- The heat recovery steam generator system components and their interaction with other plant and equipment external to that covered by this competency.
- a.c. and d.c. electrical distribution systems
- Duct burners types and characteristics
- Heat recovery steam generator construction and principles
- Thermodynamics
- Properties of Matter

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REQUIRED SKILLS AND KNOWLEDGE

- Steam turbine power and control oil systems, types and characteristics
- Compressed air systems, types and characteristics
- Steam turbine life expenditure and control
- Steam turbine bypass system types and characteristics
- Vacuum raising and turbine gland sealing systems;
- Steam Turbine types and characteristics
- Steam turbine lubrication systems types and characteristics
- Steam turbine condensate and feedwater systems
- Feedwater heating types and characteristics
- Drainage systems, types and characteristics
- Steam turbine circulating water system, types and characteristics
- Steam turbine condenser systems, types and characteristics
- Plant status
- Control and data acquisition systems
- Computers and software
- Supervisory, alarm, protection and control equipment
- Principles of generator and system stability
- The systems components and interactions
- Principles of electricity generation
- Lubrication and bearings
- Liquid pumping systems
- Power plant cycle
- Fuel type and properties
- Fuel conditioning and fuel firing equipment
- Air extraction systems
- High voltage systems
- High voltage switching procedures

T2 Specific skills needed to achieve the Performance Criteria:

- Interpret plant drawings and manufacturers manuals
- Apply relevant state and territory regulations
- Apply enterprise recording procedures
- Identify plant status
- Prepare plant/equipment for operation
- Organise resources
- Coordinate power generation
- Apply diagnostic and testing techniques
- Identify and respond to abnormal plant operating conditions
- Plan and prioritise work
- Use relevant hand tools
- Communicate effectively

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REQUIRED SKILLS AND KNOWLEDGE

- Apply data analysis techniques and tools
- Coordinate the operation of interacting systems
- Coordinate the operation of plant and equipment
- Maintain generator unit integrity
- Apply principles of electrical generation.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence

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need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti-Discrimination legislation, regulations, polices and workplace procedure
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The knowledge and application of relevant sections of:

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Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures

- The preparation and planning of work
- The operation of generator and excitation systems
- Coordination of unit operations
- Analysing plant faults
- Monitoring plant operation
- Controlling system energy generation
- The knowledge of generator and system stability principles
- Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working in limited spaces with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment

9.4)

This unit shall be assessed by methods given in Section 1.3.00

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Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

UEPOPS434B Operate and Monitor a Heat Recovery Steam Generator Unit

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole, providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Systems, plant and equipment may include generator cooling systems; fuel delivery systems; generator and generator auxiliary plant; generator seal oil system; generation fire protection system; boiler, turbine and unit coordinated control systems; generator circuit breaker/transformer; unit auxiliary switchboards; electricity market auto loading systems; generator excitation systems which may include- d.c. pilot excitors and amplidyne(s) control, a.c. pilot excitors and thyristor control, brushless systems, static systems, associated supervisory, control and protection equipment; Circuit breakers, field, excitor, flashing, associated supervisory, control and protection equipment; Transformers, excitation, earthing and neutral, voltage and current; and automatic voltage regulator (AVR) system.

Safety standards may include relevant sections of Occupational Health and Safety legislation, enterprise safety rules, national standards for plant, relevant State and

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RANGE STATEMENT

federal legislation and Australian standards.

Information and documentation sources may include verbal or written communications; enterprise safety rules documentation; enterprise operating instructions; equipment and alarm manuals; dedicated computer equipment; enterprise standing instructions and plant notes; enterprise log books; market load profile forecasts; electricity market bidding information; and manufacturer's operation and maintenance manuals.

Technical and operational indicators may include stimuli (audio, smell, touch, visual), remote or local indicators and recorders, computers and alarms (visible and/or audible).

Communications may be by means of telephone, two way radio, pager, computer (electronic mail) and operating logs (written or verbal).

Tests may include supply change-over tests, "black" start tests and capability tests.

Appropriate personnel to consult, give or receive direction may include supervisor/team leader or equivalent; other coordinators of energy production; other operating staff; technical and engineering officers or equivalent; maintenance personnel; and contractor staff.

Operating environment may be remote from plant and equipment being operated; where operation is assisted by remote indicators of plant status and other parameters monitored; during night periods; during inclement or otherwise harsh weather conditions; and in wet/noisy/dusty areas.

Unit operations (systems requirements) may include normal generating models and system auto frequency control mode.

Faults and abnormal operating conditions may include unit trip; market distribution network disturbances; loss of station a.c. supplies; spurious abnormal fuel condition, operations; generator hydrogen cooling/sealing system malfunctions; generator cooling system malfunctions; generator excitation/transformer; CB faults/malfunctions; and unit coordinated controls malfunctions.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

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Competency Field

Competency Field **11)**

Operations

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UEPOPS443A Coordinate Wind Farm Operations

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to coordinate the safe and effective management of energy production of a wind farm.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

Pre-Requisites

Prerequisite Unit(s) **4)**

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Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 4 Writing 4 Numeracy 4

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan for plant operation.	1.1 Safety issues are identified to comply with enterprise/site requirements.
	1.2 Work, plant and resource requirements are identified from relevant information and documentation.
	1.3 Pre-operational checks are carried out in accordance with enterprise and site requirements.
2 Monitor wind farm operations.	2.1 Wind turbines and equipment is monitored for normal operation in accordance with enterprise procedures.
	2.2 Alarms are acknowledged, prioritised and responded to in accordance with enterprise procedures.
	2.3 Deviations from normal operation are identified and corrective action taken is in accordance with enterprise procedures.
	2.4 Plant and equipment trends are created to monitor key areas or problems in accordance with enterprise procedures.
	2.5 Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
3 Control wind farm electrical energy production.	3.1 Wind farm energy output is controlled to meet the operational/load requirements of the enterprise and clients.
	3.2 Wind turbines are manually adjusted for operation requirements in accordance with enterprise/site and manufacturer’s procedures.
	3.3 Wind turbines are taken out of service and shut down for operational and maintenance requirements in accordance with enterprise/site and manufacturer’s procedures.

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ELEMENT	PERFORMANCE CRITERIA	
	3.4	Wind turbines are run-up and placed into service for operational requirements in accordance with enterprise/site and manufacturer's procedures.
	3.5	Appropriate personnel are notified when defects and abnormal operating conditions are detected.
4 Test wind farm operation.	4.1	Tests are performed in accordance with defined procedures applicable to the operational test.
	4.2	System/plant is observed for correct operational response.
	4.3	Corrective action is taken when response is not in accordance with documentation, plant/system integrity or personnel safety requirements.
	4.4	System/plant is returned to required operational status upon completion of test.
5 Analyse system/plant faults.	5.1	Causes of abnormal system operating conditions are identified by analysing the technical and operational information in a logical and sequential manner.
	5.2	Actions necessary to rectify fault are correctly determined.
	5.3	System/plant integrity and personnel safety are maintained through consultation with appropriate personnel, and reference to plant, technical and operational documentation.
	5.4	Appropriate personnel are arranged for local investigation of identified operational abnormalities.
6 Complete documentation.	6.1	Documentation is updated and plant problems, movements, abnormalities and status are reported and logged in accordance with enterprise/site procedures.

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired co-ordinating wind farm electrical energy production.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO443A Wind Farm Operations

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant environmental, occupational health and safety legislation and regulations.
- Enterprise procedures.
- Plant drawings and manufacturers manuals.
- Introduction to and typical arrangements of power production plant.
- Relevant plant and equipment, its location and operating parameters.
- Relevant state and territory regulations.
- Wind farm principles.
- Wind turbine types and characteristics.
- Wind turbine support systems.
- Wind turbine generator, types and characteristics.
- Wind farm control systems types and characteristics.
- Generator control systems.
- Electric motor types and characteristics.
- Switchgear types and characteristics.
- Electrical protection types and characteristics.
- Electrical principles.
- Process control principles.
- Transformers types and characteristics.
- Generator excitation and cooling systems, types and characteristics.
- Enterprise recording procedures.
- Control and data acquisition systems.
- Supervisory, alarm, protection and control equipment.
- The systems components and interactions.
- High voltage electrical systems.

T2 Specific skills needed to achieve the Performance Criteria:

- Interpret plant drawings and manufacturers manuals.
- Apply relevant state and territory regulations.
- Apply enterprise recording procedures.

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REQUIRED SKILLS AND KNOWLEDGE

- Identify plant status.
- Prepare plant/equipment for operation.
- Organise resources.
- Coordinate electrical energy generation.
- Apply diagnostic and testing techniques.
- Identify and respond to abnormal plant operating conditions.
- Plan and prioritise work.
- Use relevant hand tools.
- Communicate effectively.
- Apply data analysis techniques and tools.
- Coordinate the operation of interacting systems.
- Coordinate the operation of plant and equipment.
- Apply principles of electrical generation.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and regulatory policy.

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Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all prerequisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement

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- Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
- Conduct work observing the relevant Anti-Discrimination legislation, regulations, polices and workplace procedure

- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The preparation and planning of work
  - The operation of generator and excitation systems
  - Coordination of unit operations
  - Analysing plant faults
  - Monitoring plant operation
  - Controlling system energy generation
  - The knowledge of generator and system stability principles

Context of and specific resources for assessment **9.3)**

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working in limited spaces with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment **9.4)**

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This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines

.Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole, providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Wind farm plant and equipment may include: wind turbines, generator cooling systems, generator excitation systems, generator auxiliary plant, generation fire protection system, wind turbine control system, generator circuit breaker, transformer, switchboards, electricity market auto loading systems, supervisory and control equipment, HV protection equipment and circuit breakers.

Safety standards may include relevant sections of Occupational Health and Safety legislation, enterprise safety rules, national standards for plant, relevant State and federal legislation and Australian standards.

Information and documentation sources may include: verbal or written communications, enterprise safety rules documentation, enterprise operating instructions, equipment and alarm manuals, dedicated computer equipment, enterprise standing instructions and plant notes, enterprise log books, market load profile

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RANGE STATEMENT

forecasts, electricity market bidding information and manufacturer's operation and maintenance manuals.

Technical and operational indicators may include: stimuli (audio, smell, touch, visual), remote or local indicators and recorders, d.c.S alarms.

Communications may be by means of telephone, two way radio, pager, computer (electronic mail) and operating logs (written or verbal).

Tests may include: supply change-over tests, "black" start tests and capability tests.

Appropriate personnel to consult, give or receive direction may include supervisor/team leader or equivalent; other coordinators of energy production; technical and engineering officers or equivalent; maintenance personnel; and contractor staff.

Operating environment may be remote from plant and equipment being operated, where operation is assisted by remote indicators of plant status and other parameters monitored, during night periods, during inclement or otherwise harsh weather conditions and in wet/noisy/dusty areas.

Wind farm operations (systems requirements) may include normal generating models and system auto frequency control mode.

Faults and abnormal operating conditions may include unit trip, market distribution network disturbances, loss of station a.c. supplies, generator excitation/transformer, circuit breaker faults/malfunctions and wind turbine control malfunctions.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations

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UEPOPS444A Start and Run-up a Hydro Turbine

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to conduct a safe hydro turbine run up to a stable operating condition.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit may require a licence to practise in the workplace in some States or Territories. There may also be additional assessment activities required by regulatory authorities for the issue of the licence to practise.

Practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no prerequisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 4 Writing 4 Numeracy 4

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the

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Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Plan and prepare work	1.1	Safety issues are identified to comply with enterprise/site requirements
	1.2	Work requirements are identified from relevant personnel and documentation
	1.3	Pre-operational checks are carried out on plant according to manufacturer's recommendations and site requirements
	1.4	The turbine running up and loading schedule are ascertained from relevant documentation and in accordance with enterprise/site requirements
	1.5	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training.
2 Run up hydro turbine	2.1	Hydro turbine and alternator auxiliary systems are started up and/or made available to support turbine run up in accordance with manufacturer's and enterprise/site procedures
	2.2	Hydro turbine is run-up in accordance with manufacturer's and enterprise/site procedures
	2.3	Hydro turbine is monitored and observed to detect deviations from normal run up operating conditions Corrective actions are taken to rectify abnormalities in accordance with manufacturer's and enterprise/site procedures
	2.4	Alternator is synchronised and connected to the electrical system in accordance with enterprise and manufacturer operating procedures
	2.5	Alternator is loaded in accordance with enterprise and manufacturer operating

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ELEMENT	PERFORMANCE CRITERIA	
		procedures and regulators requirements
3 Test plant operation	3.1	Tests are performed in accordance with defined procedures applicable to the operational test
	3.2	System and plant are observed for correct operational response
	3.3	Corrective action is taken when response is not in accordance with documentation, plant integrity or personnel safety requirements
	3.4	Plant is returned to required operational status upon completion of test
4 Analyse system faults	4.1	Causes of abnormal plant operating conditions are identified by analysing the technical and operational information in a logical and sequential manner
	4.2	Corrective action taken is in accordance with enterprise/site procedures
	4.3	Plant integrity and personnel safety is maintained through consultation with appropriate personnel, and reference to plant, technical and operational documentation
	4.4	Appropriate personnel are notified when defects are detected
5 Complete documentation	5.1	Documentation is updated and plant problems, movements, abnormalities and status are reported and logged in accordance with enterprise/site procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired running up a hydro turbine.

The extent of the Essential Knowledge and Associated Skills required follows:

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REQUIRED SKILLS AND KNOWLEDGE

KS01-PO444A Start and Run-up a Hydro Turbine

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant Environmental, Occupational Health and Safety legislation and regulations
- Enterprise procedures
- Plant drawings and manufacturers manuals
- Introduction to and typical arrangements of hydro power production plant
- Relevant plant and equipment, its location and operating parameters
- Electric motor types and characteristics
- Pump and compressor types and characteristics
- Valve, damper and actuator types and characteristics
- Switchgear types and characteristics
- Electrical protection types and characteristics
- Relevant state and territory regulations
- Plant status Hydro machines operational modes
- Hydro machines online condition monitoring equipment and trends
- Automatic governor control systems types and characteristics
- Control and data acquisition systems
- Hydro turbine, types and characteristics
- Hydro turbine governor, types and characteristics
- Headgate, tailgate, intake, penstock, tunnels and tail races, types and characteristics
- Hydro alternator types and characteristics
- Alternator performance characteristics
- Speed control systems
- Electrical fundamentals
- Electrical supply and distribution systems
- Heat exchanger types and characteristics
- Lubrication systems and oil conditioning systems
- Equipment behaviours under the influence of high water pressure and/or flows

T2 Specific skills needed to achieve the Performance Criteria:

- Apply enterprise recording procedures
- Identify plant status
- Prepare plant/equipment for operation
- Organise resources
- Run-up turbine plant and equipment
- Apply diagnostic and testing techniques
- Identify and respond to abnormal plant operating conditions
- Plan and prioritise work

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REQUIRED SKILLS AND KNOWLEDGE

- Use relevant hand tools
- Communicate effectively
- Apply data analysis techniques and tools

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be ‘rich’ in nature so as to minimise error in judgment.

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Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all prerequisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement OHS workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Conduct work observing the relevant Anti-Discrimination legislation, regulations, polices and workplace procedure
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures

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- The preparation and planning of work
- The operation of turbine plant and equipment
- Operationally testing plant
- Analysing plant faults
- The knowledge of the system components and their interaction
- The knowledge of hydro turbine operational processes
- The knowledge of hydro turbine supervision and control systems
- Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment **9.3)**

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working in limited spaces with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00

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Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole, providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Plant and equipment may include turbines including Kaplan, Pelton and Francis type turbines, auxiliary plant and equipment; governor and associated hydraulic circuits; auxiliary plant; computer with equipment control functions; supervisory, alarm and control equipment; condition monitoring equipment, electrical motors, fans and pumps; electrical supply and distribution systems; valves and dampers (electric, hydraulic, pneumatic and manual); lubrication and oil conditioning systems; fire protection equipment; heat exchangers, filters and strainers; transformers; water drainage systems; and environmental protective systems.

Safety standards may include relevant sections of Occupational Health and Safety legislation, enterprise safety rules, Australian standards, national standards for plant and relevant State, and federal legislation and enterprise safety procedures and practices.

Information and documentation sources may include verbal or written

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RANGE STATEMENT

communications; enterprise safety rules documentation; enterprise operating instructions; manufacturer's operational and maintenance manuals; equipment and alarm manuals, enterprise log books, dedicated computer equipment, enterprise standing instructions and plant notes; enterprise standing instructions and plant notes.

Technical and operational indicators may include stimuli (audio, smell, touch, visual), remote or local indicators and recorders, computers and alarms (visible and or audible).

Communications may be by means of telephone, two way radio, pager, computer (electronic mail) and operating log (written or verbal).

Tests may include loss of a major auxiliary controls response checks, trip test; stand-by plant "cut-in" tests, valves operating checks, turbine valve and emergency governor operation test, pre-start tests, performance tests, heater leak checks and alarm and protection tests.

Appropriate personnel to consult, give or receive direction may include supervisor/team leader or equivalent; other coordinators of energy production or equivalent; technical and engineering officers or equivalent; maintenance staff; other operating staff and contractor staff.

Operating environment may be remote from plant and equipment being operated; where operation is assisted by remote indicators of plant status and other parameters monitored; in wet/noisy/dusty/hot areas, during night periods; and during inclement or otherwise harsh weather conditions.

Faults and abnormal operating conditions may include loss of a major auxiliary; loss of electrical supply to auxiliaries (a.c. or d.c.); high turbine bearing temperatures/vibration; high/low bearing oil temperature; loss of turbine bearing oil flow/pressure; low/high pressure heaters malfunctions; actuator/valve mechanical/ electrical faults/failure; failed field devices; and turbine protection.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations

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UEPOPS445A Shut Down a Hydro Turbine

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to conduct a shut-down of a hydro turbine to where it can be placed at rest safely.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit may require a licence to practise in the workplace in some States or Territories. There may also be additional assessment activities required by regulatory authorities for the issue of the licence to practise.

Practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no prerequisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 4 Writing 4 Numeracy 4

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the

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Evidence Guide.

Elements and Performance Criteria

ELEMENT		PERFORMANCE CRITERIA	
1	Plan and prepare work	1.1	Safety issues are identified to comply with enterprise/site requirements
		1.2	Work requirements are identified from relevant personnel and documentation
		1.3	Pre-operational checks are carried out on plant according to manufacturer's recommendations and site requirements
		1.4	The turbine running up and loading schedule are ascertained from relevant documentation and in accordance with enterprise/site requirements
		1.5	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training.
2	Shut down a hydro turbine	2.1	Hydro turbine load is reduced in accordance with enterprise and manufacturer operating procedures
		2.2	Hydro turbine and alternator are removed from the system in accordance with enterprise and manufacturer operating procedures
3	Test plant operation	3.1	Tests are performed in accordance with defined procedures applicable to the operational test
		3.2	System and plant are observed for correct operational response
		3.3	Corrective action is taken when response is not in accordance with documentation, plant integrity or personnel safety requirements
		3.4	Plant is returned to required operational status upon completion of test
4	Analyse system faults	4.1	Causes of abnormal plant operating conditions

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ELEMENT	PERFORMANCE CRITERIA	
		are identified by analysing the technical and operational information in a logical and sequential manner
	4.2	Corrective action taken is in accordance with enterprise/site procedures
	4.3	Plant integrity and personnel safety is maintained through consultation with appropriate personnel, and reference to plant, technical and operational documentation
	4.4	Appropriate personnel are notified when defects are detected
5 Complete documentation	5.1	Documentation is updated and plant problems, movements, abnormalities and status are reported and logged in accordance with enterprise/site procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired shutting down a hydro turbine.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO445A Shut Down a Hydro Turbine

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant Environmental, Occupational Health and Safety legislation and regulations
- Enterprise procedures
- Plant drawings and manufacturers manuals
- Introduction to and typical arrangements of hydro power production plant
- Relevant plant and equipment, its location and operating parameters
- Electric motor types and characteristics
- Pump and compressor types and characteristics
- Valve, damper and actuator types and characteristics
- Switchgear types and characteristics

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REQUIRED SKILLS AND KNOWLEDGE

- Electrical protection types and characteristics
- Relevant state and territory regulations
- Plant status
- Hydro machines operational modes
- Hydro machines online condition monitoring equipment and trends
- Automatic governor control types and characteristics
- Control and data acquisition systems
- Hydro turbine, types and characteristics
- Hydro turbine governor, types and characteristics
- Headgate, tailgate, intake, penstock, tunnels and tail races, types and characteristics
- Hydro alternator types and characteristics
- Alternator performance characteristics
- Speed control systems
- Electrical fundamentals
- Electrical supply and distribution systems
- heat exchanger types and characteristics
- lubrication systems and oil conditioning systems
- Equipment behaviours under the influence of high water pressure and/or flows

T2 Specific skills needed to achieve the Performance Criteria:

- Apply enterprise recording procedures
- Identify plant status
- Prepare plant/equipment for operation
- Organise resources
- Shut down turbine plant and equipment
- Apply diagnostic and testing techniques
- Identify and respond to abnormal plant operating conditions
- Plan and prioritise work
- Use relevant hand tools
- Communicate effectively
- Apply data analysis techniques and tools

Evidence Guide

EVIDENCE GUIDE

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EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, high pressure water or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be ‘rich’ in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its ‘richness’. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

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Critical aspects of evidence required to demonstrate competency in this unit **9.2)**

Before the critical aspects of evidence are considered all prerequisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement OHS workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Conduct work observing the relevant Anti-Discrimination legislation, regulations, polices and workplace procedure
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - The preparation and planning of work
  - The (add) safe and controlled shut down of turbine plant and equipment
  - Operationally testing plant
  - Analysing plant faults
  - The knowledge of the system components and their interaction
  - The knowledge of turbine operational processes
  - The knowledge of turbine supervision and control systems

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including on-line condition monitoring equipment and trends
- The knowledge of heat transfer principles
- Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working in limited spaces with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment

9.4)

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment

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and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole, providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Plant and equipment may include turbines including Kaplan, Pelton and Francis type turbines; auxiliary plant and equipment; governor and associated hydraulic circuits; computer with equipment control functions; supervisory, alarm and control equipment; electrical motors, fans and pumps; electrical supply and distribution systems; valves and dampers (electric, hydraulic, pneumatic and manual); lubrication and oil conditioning systems; condition monitoring equipment, fire protection and detection equipment; heat exchangers, filters and strainers; transformers; water drainage systems; and environmental protective systems.

Safety standards may include relevant sections of Occupational Health and Safety legislation, enterprise safety rules, Australian standards, national standards for plant and relevant State, and federal legislation and enterprise safety procedures and practices.

Information and documentation sources may include verbal or written communications; enterprise safety rules documentation; enterprise operating instructions; manufacturer’s operational and maintenance manuals; equipment and alarm manuals, enterprise log books, dedicated computer equipment, enterprise standing instructions and plant notes; enterprise standing instructions and plant notes.

Technical and operational indicators may include stimuli (audio, smell, touch, visual), remote or local indicators and recorders, computers and alarms (visible and or audible).

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RANGE STATEMENT

Communications may be by means of telephone, two way radio, pager, computer (electronic mail) and operating log (written or verbal).

Tests may include loss of a major auxiliary controls response checks, trip test; stand-by plant “cut-in” tests, valves operating checks, turbine valve and emergency governor operation test, pre-start tests, performance tests, and alarm and protection tests.

Appropriate personnel to consult, give or receive direction may include supervisor/team leader or equivalent; other coordinators of energy production or equivalent; technical and engineering officers or equivalent; maintenance staff; other operating staff and contractor staff.

Operating environment may be remote from plant and equipment being operated; where operation is assisted by remote indicators of plant status and other parameters monitored; in wet/noisy/dusty/hot areas, during night periods; and during inclement or otherwise harsh weather conditions.

Faults and abnormal operating conditions may include loss of a major auxiliary; loss of electrical supply to auxiliaries (a.c. or d.c.); high turbine bearing temperatures/vibration; high/low bearing oil temperature; loss of turbine bearing oil flow/pressure; low/high pressure heaters malfunctions; actuator/valve mechanical/ electrical faults/failure; failed field devices; and turbine protection.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations

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UEPOPS446A Operate and monitor hydro unit control and protection systems

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to operate, inspect and monitor a hydro unit control and protection systems.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety.

Pre-Requisites

Prerequisite Unit(s) **4)**

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Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no prerequisite units

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 4 Writing 3 Numeracy 4

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Plan and prepare work	1.1	Safety issues are identified to comply with enterprise/site requirements
	1.2	Work, plant and type of start requirements are identified from relevant personnel and documentation
	1.3	The turbine running-up and loading schedule are ascertained from relevant documentation and in accordance with enterprise/site requirements
	1.4	Localised plant inspection, pre operational tests and field preparation for service are carried out in accordance with manufacturer and enterprise/site procedures
	1.5	Plant operational prerequisites are established in accordance with manufacturer and enterprise/site procedures
	1.6	Sequence for recommissioning of plant is determined to suit existing circumstances in accordance with enterprise/site requirements
2 Operate control and protection systems	2.1	Plant is adjusted to achieve required plant operating requirements and demand, observing operational requirements
	2.2	Plant is operated within limits of plant design, enterprise or site requirements
	2.3	Plant is monitored and observed to detect deviations from required operating conditions
	2.4	Corrective actions are taken to rectify abnormalities in accordance with manufacturer and enterprise/site procedures
3 Test plant operation	3.1	Tests are performed in accordance with defined procedures applicable to the operational test
	3.2	System and plant are observed for correct operational response

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ELEMENT		PERFORMANCE CRITERIA	
		3.3	Correct action is taken when response is not in accordance with documentation, plant integrity or personnel safety requirements
		3.4	Plant is returned to required operational status upon completion of test
4	Analyse plant faults	4.1	Cause of abnormal plant operating conditions are identified by analysing the technical and operational information in a logical and sequential manner
		4.2	Actions necessary to rectify fault are correctly determined
		4.3	Plant integrity and personnel safety is maintained through consultation with appropriate personnel, and reference to plant, technical and operational documentation
		4.4	Appropriate personnel is notified when defects are detected
5	Monitor and inspect plant	5.1	Plant to be monitored/inspected is physically identified
		5.2	Plant is monitored/inspected for normal operation or to detect deviations
		5.3	Corrective action taken is in accordance with enterprise procedures
		5.4	Appropriate personnel are notified when defects are detected
6	Complete documentation	6.1	Documentation is updated and plant problems, movements, abnormalities and status are reported and logged in accordance with enterprise/site procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this

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REQUIRED SKILLS AND KNOWLEDGE

unit.

Evidence shall show that knowledge has been acquired of operating a hydro unit control and protection systems.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO446A Hydro unit control and protection systems

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant Environmental, Occupational Health and
- Enterprise procedures
- Plant drawings and manufacturers manuals
- Introduction to and typical arrangements of hydro power production plant
- Relevant plant and equipment, its location and operating parameters
- Hydro power plant protection systems types and characteristics
- Hydro power plant control system types and characteristics
- Automatic voltage regulators types and characteristics
- Switchgear types and characteristics
- Electrical protection types and characteristics
- Control and data acquisition systems
- Generator/alternator types and characteristics
- Generator /alternator performance characteristics
- PLC types and characteristics
- Electrical fundamentals
- Generator/alternator theory of operation

T2 Specific skills needed to achieve the Performance Criteria:

- Interpret plant drawings and manufacturers manuals
- Apply relevant state and territory regulations
- Apply enterprise recording procedures
- Identify plant status
- Prepare plant/equipment for operation
- Organise resources
- Apply diagnostic and testing techniques
- Identify and respond to abnormal plant operating conditions
- Plan and prioritise work
- Use relevant hand tools
- Communicate effectively
- Apply data analysis techniques and tools

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Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all component parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

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Critical aspects of evidence required to demonstrate competency in this unit **9.2)**

Before the critical aspects of evidence are considered all prerequisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Conduct work observing the relevant Anti-Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Preparation and planning of work
  - Operation of hydro unit control and protection systems
  - Operationally testing plant
  - Analysing plant faults
  - Monitoring plant operation
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic

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Context of and specific resources for assessment **9.3)**

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note: Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

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There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the unit of competency as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Hydro unit control and protection systems may include turbine control systems, generator /alternator control systems, automatic voltage regulators supervisory, alarm and control equipment; electrical supply and distribution systems; fire protection equipment; and environmental protective systems.

Safety standards may include relevant sections of Occupational Health and Safety legislation, enterprise safety rules, relevant state and federal legislation, national standards for plant and Australian standards.

Information and documentation sources may include verbal or written communications; enterprise safety rules documentation; enterprise operating instructions; dedicated computer equipment; enterprise/site standing and operating instructions; enterprise log books; manufacturer operation and maintenance manuals; and equipment and alarm manuals.

Technical and operational indicators may include stimuli (audio, smell, touch, visual), remote or local indicators and recorders, computers and alarms (visible and or audible).

Tests may include HV relay tests, control system operation tests and automatic voltage regulators tests

Communications may be by means of telephone, two way radio, pager, computer (electronic mail) and operating logs (written or verbal).

Appropriate personnel to consult, give or receive direction may include, supervisor/team leader , network regulator, engineering officer, maintenance office or equivalent, technical and officers, contractor staff, maintenance staff,

Test, fault finding and operating tools may include low and high voltage testers, proving dead equipment, powered or non-powered hand tools.

Operating environment may be remote from plant, aided by indicators and monitors, during inclement or otherwise harsh weather conditions, in wet/noisy/dusty/hot areas, during night periods or locally aided by visual and audible indicators.

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RANGE STATEMENT

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations.

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UEPOPS447A Coordinate photovoltaic solar power plant operations

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge for the co-ordination of the operations of a photovoltaic solar power plant.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety.

Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

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Prerequisite Unit(s) **4)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no prerequisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 4 Writing 4 Numeracy 4

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT		PERFORMANCE CRITERIA	
1	Coordinate the plant operations	1.1	Plant operational procedures are implemented in consultation with others and reviewed as required
		1.2	Resources and supplies are coordinated to meet plant requirements
2	Monitor plant operations	2.1	Deviations from standard plant operations are identified and recorded
		2.2	Plant operation and/or condition is monitored against statutory and enterprise requirements taking into account constraints, budget requirements and performance indicators
		2.3	New requirements that may impact on operations are considered
		2.4	Operations are monitored for suitability/approval with statutory, industry and enterprise/site requirements
3	Test plant operation	3.1	Tests are performed in accordance with defined procedures applicable to the operational test
		3.2	Plant is observed for correct operational response
		3.3	Correct action is taken when response is not in accordance with documentation, plant integrity or personnel safety requirements
		3.4	Plant is returned to required operational status upon completion of test
4	Analyse plant faults	4.1	Causes of abnormal plant operating conditions are identified by analysing the technical and operational information in a logical and sequential manner
		4.2	Actions necessary to rectify fault are correctly determined
		4.3	Plant integrity and personnel safety are maintained through consultation with appropriate personnel, and reference to plant,

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ELEMENT	PERFORMANCE CRITERIA	
		technical and operational documentation
	4.4	Appropriate personnel are arranged for local investigation of identified operational abnormalities
5 Report operations against strategy requirements	5.1	Data is collected and processed for review against the established strategy
	5.2	Plant operation and/or condition is reported against statutory and enterprise requirements taking into account constraints, budget requirements and performance indicators
	5.3	Abnormal operating conditions are reported
	5.4	Changes to the strategy are suggested in accordance with information received

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired co-ordinating operational strategies for power production.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO447A Photovoltaic solar power plant operations

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant environmental, occupational health and safety legislation and regulations
- Enterprise procedures
- Plant drawings and manufacturers manuals
- Introduction to and typical arrangements of photovoltaic solar power plant
- Relevant plant and equipment, its location and operating parameters
- Photovoltaic Solar Power Plant operating parameters
- Relevant performance targets
- Relevant plant reliability targets
- Photovoltaic Solar Power Plant efficiency

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REQUIRED SKILLS AND KNOWLEDGE

- Problem solving techniques
- Data collection and recording techniques
- Risk management principles
- Photovoltaic Solar Power Plant operating parameters
- Enterprise recording procedures
- Measurement and analysis systems and procedures
- Communication principles
- Risk management principles.

T2 Specific skills needed to achieve the Performance Criteria:

- Interpret plant drawings and manufacturers manuals
- Apply relevant state and territory regulations
- Apply enterprise recording procedures
- Identify plant status
- Apply problem solving
- Plan and prioritise work
- Communicate effectively
- Apply risk management principles
- Apply data analysis techniques and tools.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

9.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry preferred model for apprenticeships. However, where summative (or final) assessment is used it is to

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include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all prerequisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:

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- Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
- Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
- Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
- Conduct work observing the relevant Anti-Discrimination legislation, regulations, polices and workplace procedure

- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Plant operating parameters
  - Generation plant and systems
  - Communications
  - Co-ordinating operational strategies
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

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In addition to the resources listed above in Context of assessment', evidence should show competency working in limited spaces with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment

9.4)

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole, providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Reference information includes operational data, maintenance data, market requirements and statutory requirements.

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RANGE STATEMENT

Communication includes liaison with stakeholders.

Reference documentation includes plant reliability and efficiency reports, operating, maintenance procedures, manuals, drawings, original equipment manufacturer data, statutory requirements and standards.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations

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UEPOPS450A Coordinate effective workplace communication

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to coordinate effective workplace communication and workplace meetings.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships.

Pre-Requisites

Prerequisite Unit(s) **4)**

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Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
UEPOPS338B	Facilitate effective workplace communication

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 4 Writing 4 Numeracy 4

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the Performance Criteria describe the required performance

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essential outcomes of a competency standard unit	needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT		PERFORMANCE CRITERIA	
1	Plan and prepare for communication	1.1	Communication requirements are identified from analysis of probable work requirements and customer service activities
		1.2	Communication network is planned and established to ensure reliable, expeditious and cost effective communications in accordance with enterprise/site requirements
		1.3	Communications network is monitored and modified as required in accordance with enterprise/site requirements
		1.4	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2	Coordinate team communications	2.1	Forums, including briefings, meetings and committees, are scheduled as required in accordance with enterprise/site requirements
		2.2	Communications network information is provided to team members to ensure maximum efficiency in accordance with site requirements
		2.3	Communications skill deficiencies are identified and team members made aware of action required and informed of remedial options available in accordance with enterprise policy
		2.4	Team members are encouraged to participate in the creation of an environment in which all views are aired and considered in accordance with enterprise policy
3	Coordinate workplace meetings	3.1	Meetings are planned and organised including distribution and clarification of agenda, notification of date, venue and required

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ELEMENT	PERFORMANCE CRITERIA	
		attendees and administration requirements, in accordance with site requirements
	3.2	Format and rules of meetings are identified, agreed, established and applied in accordance with site requirements
	3.3	Views of all parties are identified and presented, including agreement and dissent, to obtain a balanced position in accordance with enterprise policy
	3.4	Outcomes and agreed action plans are recorded and details of next meeting confirmed before closing in accordance with site requirements
4 Represent team views	4.1	Team viewpoint is determined, including possible options and acceptable alternatives or compromises prior to presentation
	4.2	Team viewpoints are presented in clear, concise and logical manner accepting the need for rational and productive debate
	4.3	Decisions and outcomes are conveyed to team members to accurately portray their position

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of facilitating effective workplace communication.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO450A Effective workplace communication

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant environmental, occupational health and safety legislation and regulations
- Enterprise procedures

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REQUIRED SKILLS AND KNOWLEDGE

- Meeting communication principles
- Document writing principles
- Enterprise communication equipment and procedures
- Enterprise documentation procedures
- Enterprise meeting agenda requisites
- Enterprise recording procedures
- Enterprise communication procedures

T2 Specific skills needed to achieve the Performance Criteria:

- Interpret instructions
- Write meeting minutes
- Facilitate meetings
- Extract information
- Communicate effectively.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord

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with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all prerequisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as

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specified in the Performance Criteria and Range Statement
    - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
    - Conduct work observing the relevant Anti-Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
    - Knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
    - Planning and preparing for communication
    - Facilitating team meetings
    - Communication procedures
    - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

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Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note: Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the unit of competency as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Communications may include face to face discussions, letters, telephone, facsimile, time sheets, radios, e-mail, memos, workplace/toolbox meetings and approved enterprise proformas.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

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Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations.

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UEPOPS451A Coordinate the use of contingency plans

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to coordinate the use contingency plans developed to support the integrity of the enterprise.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships.

Pre-Requisites

Prerequisite Unit(s) **4)**

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Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
UEPOPS370A	Facilitate the use of contingency plans

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 4 Writing 4 Numeracy 4

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the Performance Criteria describe the required performance

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essential outcomes of a competency standard unit	needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT		PERFORMANCE CRITERIA	
1	Identify contingencies	1.1	Contingencies are identified from an identification and analysis of functions which are critical to the performance of the team/enterprise
		1.2	Contingencies plans are arranged in order of recommended priority and the contingencies to be used is evaluated
2	Identify preferred contingency plans	2.1	Options for satisfying contingency needs are identified from identification and analysis of the critical functions of the team/enterprise
		2.2	Preferred contingency option is identified following a detailed analysis of the human, fiscal and material factors of the alternative options
		2.3	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
3	Complete documentation	3.1	Documentation is updated and plant problems, movements, abnormalities and status are reported and logged in accordance with enterprise/site procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of developing contingency plans.

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REQUIRED SKILLS AND KNOWLEDGE

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO451A The use of contingency plans

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant environmental, occupational health and safety legislation and regulations
- Enterprise procedures
- Plant drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Relevant plant and equipment, its location and operating parameters
- Enterprise recording procedures
- Enterprise procedure
- Communication procedures

T2 Specific skills needed to achieve the Performance Criteria:

- Interpret plant drawings and manufacturers manuals
- Apply enterprise recording procedures
- Communicate effectively
- Use data analysis techniques and tools
- Use diagnostic techniques
- Plan and prioritise work
- Develop contingency plans.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that

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can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all prerequisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

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- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Conduct work observing the relevant Anti-Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Identifying contingency options
  - Developing contingency plan
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary

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evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment

9.4)

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the unit of competency as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

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RANGE STATEMENT

Appropriate personnel for consultation, to give or receive direction may include supervisor/team leader or equivalent, power plant operations personnel or equivalent, technical and engineering officers or equivalent, maintenance staff, other operating staff or equivalent, system controller/network controller, field operator, restricted H.V. operators and external stake holders.

Safety standards may include relevant sections of Occupational Health and Safety legislation, relevant state and federal legislation, national standards for plant and enterprise safety rules

Information and documentation sources may include verbal or written communications; enterprise safety rules documentation; enterprise operating instructions; dedicated computer equipment; enterprise/site standing and operating instructions; enterprise log books; manufacturer operation and maintenance manuals; and equipment and alarm manuals.

Communications may be by means of telephone, two way radio, pager, computer (electronic mail) and operating logs (written or verbal).

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations.

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UEPOPS452A Conduct operational checks and carry out corrective action on in-service electrical plant

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to conduct operational checks and carry out any necessary corrective action on in-service electrical plant.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety.

Pre-Requisites

Prerequisite Unit(s) **4)**

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Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no prerequisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 4 Writing 4 Numeracy 4

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan for plant in-service checks	1.1 Safety issues are identified to comply with enterprise/site requirements
	1.2 Work, plant and resource requirements are identified from relevant information, requests, work orders or equivalent and documentation.
	1.3 Plant status and work requirements are clarified/confirmed with appropriate parties or by site inspection
	1.4 Equipment is check for correct calibration, operation. correct size, type and quantity of materials/components are determined, obtained and inspected for compliance with the job specifications
	1.5 Potential hazards are identified and prevention and/or control measures are selected in accordance with the work plan and site procedures
	1.6 Pre access checks are carried out in accordance with enterprise and site requirements
	1.7 Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2 Carry out in-service electrical checks	2.1 Systems/plant is operated in accordance with enterprise/site and manufacturer operating procedures
	2.2 In-service electrical checks are done in conjunction with others involved in, or affected by, the work in accordance with the work plan
	2.3 Plant checks are monitored and observed to detect deviations from normal operation
	2.4 In-service checks are performed in accordance with defined enterprise procedures.

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ELEMENT	PERFORMANCE CRITERIA	
	2.5	System/plant integrity and personnel safety are maintained through consultation with appropriate personnel, and reference to plant, technical and operational documentation
3 Carry out necessary corrective actions	3.1	Corrective actions are identified after analysing plant operations in accordance with manufacturer and enterprise/site procedures
	3.2	Required isolations are confirmed where appropriate in accordance with site requirements
	3.3	Equipment is modified using appropriate plans, drawings and texts in accordance with the work plan
	3.4	Equipment is modified in conjunction with others involved in, or affected by, the work in accordance with the work plan
	3.5	Corrective actions are carried out, mindful of effects on, or unnecessary loss of, other equipment in accordance with the work plan
	3.6	Modified equipment is set up to suit operational requirements and in accordance with manufacturer specifications and the work plan
	3.7	Final plant inspection is performed and permits relinquished as required in accordance with the work plan
3 Complete the work	3.1	When checks and corrective actions are completed, control measures are returned to required operational status where appropriate.
	3.2	Appropriate personnel are notified of the completion of work in accordance with enterprise/site procedures
	3.3	Plant problems and corrective actions are reported and logged in accordance with enterprise/site procedures
	3.4	Check results and corrective actions are interpreted and documented in accordance with enterprise/site procedures

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of conducting operational checks on in-service electrical plants.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO452A Operational checks and corrective action on in-service electrical plant

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant environmental, occupational health and safety legislation and regulations
- Enterprise procedures
- Plant drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Relevant plant and equipment, its location and operating parameters
- Electric motor types and characteristics
- Switchgear types and characteristics
- Electrical protection types and characteristics
- Electrical fundamentals
- Transformers, types and characteristics
- Isolation procedures
- Modification techniques
- Test and measurement instruments;
- Circuit plan appreciation;
- Engineering and workshop practice;
- Plant status
- Enterprise recording procedures

T2 Specific skills needed to achieve the Performance Criteria:

- Interpret plant drawings and manufacturers manuals
- Apply enterprise recording procedures
- Identify plant status
- Prepare plant/equipment for checks
- Communicate effectively
- Maintain plant integrity
- Apply data analysis techniques and tools

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REQUIRED SKILLS AND KNOWLEDGE

- Recognise abnormal plant operating conditions
- Apply or determine appropriate corrective actions required
- Carry out appropriate corrective actions
- Plan and prioritise work
- Interpret remote indication of plant status and condition

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence

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need to be ‘rich’ in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its ‘richness’. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all prerequisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the “Assessment Guidelines – UEP12”. Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Conduct work observing the relevant Anti-Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory

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legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures

- Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items

Context of and specific resources for assessment **9.3)**

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note: Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

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Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the unit of competency as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Operational Checks may include fault finding, performance checking, indication and protection checks and work on control and trip circuits and minor testing.

Work may be performed with equipment on line.

Key indicators may include frequency, machine/ equipment voltage and current, plant temperatures, reactive power flows, power factor, plant load capabilities, protection settings, visual and audible indicators, analogue and digital displays.

Plant and/or equipment may include electrical plant associated with turbines; generators; fans; pumps; heat exchangers; cooling systems; chemical treatment and water quality system;, fuel delivery system; auxiliary plant; fire protection system; and motors; transformers; switchgear; electrical/electronic control systems; generator excitation system; and switchboards.

Safety standards may include relevant sections of Occupational Health and Safety legislation, enterprise safety rules, national standards for plant, relevant state and federal legislation and Australian standards.

Information and documentation sources may include verbal or written communications; enterprise safety rules documentation; enterprise operating instructions; equipment and alarm manuals; dedicated computer equipment; enterprise standing instructions and plant notes; enterprise log books; manufacturer operation and maintenance manuals.

Technical and operational indicators may include stimuli (audio, smell, touch, visual), remote or local indicators and recorders, computers and alarms (visible and or audible)

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RANGE STATEMENT

Appropriate personnel for consultation, to give or receive direction may include supervisor/team leader or equivalent; other coordinators of energy production; other operating staff; technical and engineering officers or equivalent; maintenance personnel; and contractor staff.

Work completion details may include plant and maintenance records, job cards, check sheets and on device labelling updates.

Work site environment may be affected by nearby plant or processes, e.g. heat, noise, dust, oil, water and chemical.

Isolations can refer to electrical/mechanical or other associated processes.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations.

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UEPOPS453A Monitor Occupational Health and Safety policy and procedures compliance

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to implement and monitor the organisation's Occupational Health and Safety policies, procedures and programs in the relevant work area to achieve and maintain Occupational Health and Safety standards.

This unit describes generic Occupational Health and Safety competencies applicable for employees with supervisory responsibilities to be exhibited in the work area of responsibility

It requires the ability to implement and comply with workplace procedures in hazard identification and risk control, observation of others safe practices during work operations and conduct of participative arrangements for maintaining health and safety in the workplace.

Application of the Unit

Application of the Unit **2)**

This unit describes generic Occupational Health and Safety competencies applicable for employees with some supervisory responsibilities.

It involves application of relevant Occupational Health and Safety legislation and codes of practice, including duties and responsibilities of all parties under the general duty of care.

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Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, employment in the Electricity Supply industry is subject to regulations directly related to Occupational Health and Safety.

Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
UEPOPS201B	Comply with Occupational Health and Safety policy and procedures.
UEPOPS364A	Ensure Compliance with Occupational Health and Safety policy and procedures

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 4 Writing 4 Numeracy 4

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Employability Skills Information

Employability Skills	**5)**
	The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Provide information to the work group about Occupational Health and Safety and the organisation's policies, procedures and programs	1.1 Relevant provisions of Occupational Health and Safety legislation and codes of practice are accurately and clearly explained to the work group
	1.2 Information on the organisation's Occupational Health and Safety policies, procedures and programs is provided in a readily accessible manner and is accurately and clearly explained to the work group
	1.3 Information about identified hazards and the outcome of risk assessment and risk control procedures is regularly provided and is accurately and clearly explained to the work group
	1.4 Where appropriate, the teams and individuals roles and responsibilities within the team are identified, and, where required, assist in the

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ELEMENT	PERFORMANCE CRITERIA	
		provision of on-the-job training
2 Implement and monitor participative arrangements for the management of OHS	2.1	Organisational procedures for consultation over Occupational Health and Safety issues are implemented and monitored to ensure that all members of the work group have the opportunity to contribute
	2.2	Issues raised through consultation are dealt with and resolved promptly, or referred to the appropriate personnel for resolution in accordance with workplace procedures for issue resolution
	2.3	The outcomes of consultation over Occupational Health and Safety issues are made known to the work group promptly
3 Implement and monitor the organisation's procedures for identifying hazards and assessing risks	3.1	Existing and potential hazards in the work area are identified and reported so that risk assessment and risk control procedures can be applied
4 Implement and monitor the organisation's procedures for controlling risks	4.1	Work procedures to control risks are implemented and adherence to them by the work group is monitored in accordance with workplace procedures
	4.2	Existing risk control measures are monitored and results reported regularly in accordance with workplace procedures
	4.3	Inadequacies in existing risk control measures are identified in accordance with the hierarchy of control and reported to designated personnel
	4.4	Inadequacies in resource allocation for implementation of risk control measures are identified and reported to designated personnel
5 Implement the organisation's procedures for dealing with hazardous events	5.1	Workplace procedures for dealing with hazardous events are implemented whenever necessary to ensure that prompt control action is taken

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ELEMENT		PERFORMANCE CRITERIA	
		5.2	Hazardous events are investigated to identify their cause in accordance with investigation procedures
		5.3	Control measures to prevent recurrence, and minimise risks of hazardous events, are implemented, based on the hierarchy of control if within scope of responsibilities and competencies, or alternatively referred to designated personnel for implementation
6	Implement and monitor the organisation's procedures for providing Occupational Health and Safety training	6.1	Occupational Health and Safety training needs are identified accurately, specifying gaps between Occupational Health and Safety competencies required and those held by work group members
		6.2	Arrangements are made for fulfilling identified Occupational Health and Safety training needs in both on and off-the-job training programs in consultation with relevant parties
7	Implement and monitor the organisation's procedure for maintaining Occupational Health and Safety records	7.1	Occupational Health and Safety records for work area are accurately and legibly completed in accordance with workplace requirements for Occupational Health and Safety records and legal requirements for the maintenance of records of occupational injury and disease
		7.2	Aggregate information from the area's Occupational Health and Safety records is used to identify hazards and monitor risk control procedures within work area according to organisational procedures and within scope of responsibilities and competencies

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired monitoring compliance with

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REQUIRED SKILLS AND KNOWLEDGE

Occupational Health and Safety policy and procedures.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO453A Occupational health and safety policy and procedures compliance

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant Occupational Health and Safety regulations
- Relevant statutory legislation
- Relevant enterprise/site safety procedures including identification of hazards and controlling of risks
- Enterprise /site emergency procedures and techniques
- Environmental legislation
- Participative arrangements including safety committees
- Provision of Occupational Health and Safety instruction to others
- Maintenance of Occupational Health and Safety records
- Team leadership techniques

T2 Specific skills needed to achieve the Performance Criteria:

- Apply relevant Occupational Health and Safety regulations
- Apply relevant statutory legislation
- Apply relevant enterprise/site safety procedures
- Apply enterprise /site emergency procedures and techniques
- Apply enterprise recording procedures
- Communicate effectively.
- Apply team leadership techniques

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

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Overview of Assessment

9.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be ‘rich’ in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its ‘richness’. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered

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holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti-Discrimination legislation, regulations, polices and workplace procedure
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Evidence of understanding of hierarchy of control (the preferred order of risk control measures for most to least preferred, i.e. elimination, engineering controls, administrative controls and personal protective equipment) is required.
  - Evidence of understanding of the significance of other management systems and procedures for Occupational Health and Safety is required.
  - Evidence of knowledge of literacy levels and communication skills of work group members and consequent suitable communication techniques is required.
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice

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using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working in limited spaces with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note: Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

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Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole, providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

The Range Statement describes the context for applying this competency, the range of plant and equipment covered and the operating conditions encountered.

In accordance with all relevant Occupational Health and Safety legislation, particularly general duty of care; requirements for the maintenance and confidentiality of records of occupational injury and disease; provision of information and training; regulations and codes of practice relating to hazards present in work area.

In accordance with workplace procedures for inspection; housekeeping; consultation processes, whether general or specific to Occupational Health and Safety; training and assessment; specific hazard policies and procedures; Occupational Health and Safety information; Occupational Health and Safety record keeping; maintenance of plant and equipment; purchasing of supplies and equipment.

Hazardous events include accidents, fires and emergencies such as chemical spills or bomb scare. Procedures for dealing with them include evacuation, chemical containment and First Aid procedures

Health and safety representatives and Occupational Health and Safety committees; issue resolution and counselling/disciplinary processes.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations.

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UEPOPS454A Coordinate response to critical incidents

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit refers to the coordination of the response to incidents of a critical nature that may impact on the operational effectiveness of the plant or system, endanger human life or property, or have an adverse impact on the environment.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
UEPOPS369A	Respond to a critical incident

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading	4	Writing	4	Numeracy	4

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

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Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT		PERFORMANCE CRITERIA	
1	Identify critical incident and consequences	1.1	Critical incidents and probable implications are identified and evaluated in accordance with enterprise procedures
		1.2	Secondary threats to situation are identified and monitored in accordance with enterprise procedures
		1.3	Data is evaluated in accordance with enterprise procedures to determine probable causes, consequences and potential responses
		1.4	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training.
2	Establish contingency plan	2.1	Contingency plans are identified using relevant enterprise documentation and procedures
		2.2	Requirements for additional resources are identified in accordance with enterprise procedures
		2.3	Alternate contingencies to cater for crisis variations are developed in consultation with team members
3	Establish communications	3.1	Communication links with appropriate external authorities for coordination of their resources are established in accordance with enterprise procedures
		3.2	Communication with appropriate key stakeholders is established to disseminate information in accordance with enterprise

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ELEMENT		PERFORMANCE CRITERIA	
			procedures
		3.3	Team roles, both internal and external, are identified and conveyed to appropriate personnel in accordance with enterprise procedures
4	Coordinate response to critical incident	4.1	Response is coordinated in accordance with enterprise/site requirements and allowances for personnel/equipment limitations are made
		4.2	Events and responses are prioritised taking into account needs of stakeholders in accordance with enterprise procedures
		4.3	Impact of secondary threats are identified and assessed in accordance with enterprise procedures
		4.4	Contingency plans are actioned in accordance with enterprise/site policy and procedure
		4.5	Additional resources are coordinated and directed in accordance with enterprise procedures
		4.6	Restoration strategies are monitored, evaluated and adjusted as necessary in accordance with enterprise procedures
5	Document incident and response	5.1	Equipment failure/problems are recorded and processed in accordance with enterprise procedures
		5.2	Feedback from stakeholders is recorded where necessary and analysed in accordance with enterprise procedures
		5.3	Required reports and findings are generated and distributed to appropriate personnel in accordance with enterprise procedures
		5.4	Improvements to the critical incident procedures are recommended to the appropriate parties in accordance with enterprise procedures
		5.5	Alternative contingencies are identified, analysed and recommendations are communicated to appropriate personnel in

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ELEMENT	PERFORMANCE CRITERIA
	accordance with enterprise procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired managing critical incidents.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO454A Response to critical incidents

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant environmental, occupational health and safety legislation and regulations
- Enterprise procedures
- Plant drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Relevant plant and equipment, its location and operating parameters
- Plant status
- Enterprise recording procedures
- System/network characteristics
- Contingency plans
- Supervisory, alarm, protection and control equipment
- Load shedding principles
- Control and data acquisition systems
- Switching practices and procedures

T2 Specific skills needed to achieve the Performance Criteria:

- Interpret plant drawings and manufacturers manuals
- Apply enterprise recording procedures
- Manager and control system/network
- Identify plant status
- Communicate effectively
- Apply data analysis techniques and tools
- Identify and respond to abnormal system operating conditions

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REQUIRED SKILLS AND KNOWLEDGE

- Plan and prioritise work
- Coordinate the operation of system/network to maintain plant integrity, personnel safety, continuity of supply and optimum efficiency
- Apply stress management techniques
- Direct and coordinate personnel
- Select appropriate load shedding
- Apply diagnostic techniques.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

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The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti-Discrimination legislation, regulations, polices and workplace procedure

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- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Knowledge of emergency procedures
  - Knowledge of the rolls of external authorities/bodies
  - Ability to establish and manage emergency situations
  - Ability to tactical decision making techniques
  - Policies for system incident and follow up procedures
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment **9.3)**

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working in limited spaces with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment **9.4)**

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This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole, providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Safety standards may include relevant sections of Occupational Health and Safety legislation, enterprise safety rules, relevant State and federal legislation, national standards for plant.

Information and documentation sources may include verbal or written communications; enterprise safety rules documentation; enterprise operating instructions; dedicated computer equipment; enterprise/site standing and operating instructions; enterprise log books; manufacturer’s operation and maintenance manuals; and equipment and alarm manuals.

Technical and operational indicators may include stimuli (audio, smell, touch, visual), local indicators and recorders, computers and alarms (visible and or audible).

Communications may be by means of telephone, two way radio, pager, computer

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RANGE STATEMENT

(electronic mail) and operating logs (written or verbal).

Appropriate personnel, team members/other authorities may include supervisor/team leader or equivalent, power plant operations personnel or equivalent, technical and engineering officers or equivalent, maintenance staff, other operating staff or equivalent, system controller, field operators, restricted operators, emergency personnel, network controllers/coordinators, generation controllers, plant operators, field operators, support staff, fire service, police, ambulance, emergency services, enterprise and site representatives and independent power producers.

Operating environment may be: remote from plant and equipment being operated (operation is assisted by remote indicators of plant status and other parameters monitored), during inclement or otherwise harsh weather conditions, in wet/noisy/dusty areas or during night periods.

Unit operations may include spurious faults in automatic systems, automatic systems operating out of range, failure of automatic system components and routine plant movement.

Types of incident may include localised blackout, interconnected/isolated power system potential power system threat, accidents, life threatening situations, generation plant and auxiliary plant faults/failure and loss of network and generation components, natural and environmental disasters.

System conditions may be: voltage profiles, spare plant, generation/transmission capability limits, variation from normal trends and switching.

Documentation may include policy, procedure, standard operating instructions, contingency plans and emergency switching programs.

Liaison with key stakeholders may be system/network controllers/coordinators, oncoming shift change, field operators, support staff, patrolmen, generation plant operators, on call staff, police, fire and emergency services and private systems.

Post incident debrief may be: probable fault/failure cause, strategic/contingency plan, environmental implications, economic factors, policy, procedure, training, safety factors and emergency switching programs.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

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Competency Field

Competency Field **11)**

Operations

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UEPOPS456A Perform switching to a switching program

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to perform a switching to a switching program.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

Pre-Requisites

Prerequisite Unit(s) **4)**

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Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 4 Writing 4 Numeracy 4

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT		PERFORMANCE CRITERIA	
1	Prepare for switching program	1.1	Confirm qualifications/authorisations to perform switching operations with party coordinating switching program
		1.2	Occupational health & safety standards, statutory/enterprise regulations, codes of practice and environmental requirements are identified, applied and monitored throughout the program
		1.3	Contingency plans are discussed with party coordinating switching program
		1.4	Permits and access requirements are identified prior to program commencement
		1.5	Documentation is received and checked prior to starting the switching program
		1.6	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2	Carry out switching program	2.1	Confirm all parties involved in switching program are advised and directed to locations by party coordinating the switching
		2.2	Communication is established with the party coordinating the switching and they are maintained throughout duration of program
		2.3	Access to plant is obtained in accordance with enterprise/site policy
		2.4	Switching program steps are verified before and after each operation
		2.5	Switching steps are logged upon successful completion of each operation
		2.6	Permits are issued are monitored and recorded in accordance with enterprise procedures
		2.7	Switching program is completed and recorded in

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ELEMENT	PERFORMANCE CRITERIA	
		accordance with enterprise procedures
3	Complete documentation	3.1 Documentation is updated and equipment problems, abnormalities and status are reported and logged in accordance with enterprise/site procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired co-ordinating and directing switching programs.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO456A Switching to a switching program

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant environmental, occupational health and safety legislation and regulations
- Enterprise procedures
- Plant drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Relevant plant and equipment, its location and operating parameters
- Relevant state and territory regulations
- Switchgear types and characteristics
- Electrical protection types and characteristics
- Electrical principles
- a.c. generators types and characteristics
- Transformers types and characteristics
- Risk management
- Leadership techniques
- Plant status
- Enterprise recording procedures
- Switching operations and procedures
- System diagrams

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REQUIRED SKILLS AND KNOWLEDGE

- Systems (network)
- Computers and software

T2 Specific skills needed to achieve the Performance Criteria:

- Interpret plant drawings and manufacturers manuals
- Apply relevant state and territory regulations
- Apply enterprise recording procedures
- Identify plant status
- Communicate effectively
- Acquire and analyse information relevant to system operation
- Recognise abnormal plant/system operating conditions
- Determine appropriate corrective actions required
- Plan and prioritise work
- Acquire and analyse information relevant to system operation
- Recognise abnormal plant/system operating conditions
- Apply leadership techniques
- Determine appropriate corrective actions required.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency

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in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control

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measures as specified in the Performance Criteria and Range Statement
- Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
- Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
- Demonstrate an appropriate level of employability skills
- Conduct work observing the relevant Anti-Discrimination legislation, regulations, polices and workplace procedure

- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Preparing for switching programs
  - Directing and coordinating switching programs
  - Monitoring system integrity and stability
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working in limited spaces with different types of plant and equipment as well as different

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structural/construction types and methods and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines..

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole, providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Safety standards may include relevant sections of Occupational Health and Safety legislation, enterprise safety rules, relevant State and federal legislation and national standards for plant.

Information and documentation sources may include verbal or written communications; enterprise safety rules documentation; enterprise operating

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RANGE STATEMENT

instructions; dedicated computer equipment; enterprise/site standing and operating instructions; enterprise log books; manufacturer's operation and maintenance manuals; and equipment and alarm manuals.

Technical and operational indicators may include stimuli (audio, smell, touch, visual), local indicators and recorders, computers and alarms (visible and or audible).

Communications may be by means of telephone, two way radio, pager, computer (electronic mail), operating logs (written or verbal), faxes and reports.

Appropriate personnel for consultation, to give or receive direction may include supervisor/team leader or equivalent, power plant operations personnel or equivalent, technical and engineering officers or equivalent, maintenance staff, other operating staff or equivalent, high voltage operators, restricted high voltage operators, testers in charge, testers, recipient in charge, recipients, contractors and system/network operators.

Work parties may include enterprise personnel and contractors.

Operating environment may be remote from plant and equipment being operated (operation is assisted by remote indicators of plant status and other parameters monitored), during inclement or otherwise harsh weather conditions, in wet/ noisy/dusty areas or during night periods.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations

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UEPOPS457A Control electrical energy production

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to control the safe and effective operation of energy production to meet demand on an electricity generating unit.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 4 Writing 4 Numeracy 4

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the

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Evidence Guide.

Elements and Performance Criteria

ELEMENT		PERFORMANCE CRITERIA	
1	Plan for plant operation	1.1	Safety issues are identified to comply with enterprise/site requirements
		1.2	Work, plant and resource requirements are identified from relevant information and documentation
		1.3	Pre-operational checks are carried out in accordance with enterprise and site requirements
2	Operate generator and excitation system	2.1	System is operated in accordance with enterprise/site and manufacturer's operating procedures
		2.2	Synchronising requirements are assessed, evaluated and achieved to ensure machine/system stability during synchronising
		2.3	System is monitored and observed to detect deviations from normal operating conditions
		2.4	Corrective actions are taken to rectify abnormalities in accordance with manufacturer's and enterprise/site procedures
		2.5	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
3	Control generation of electrical energy	3.1	Generator output is adjusted to meet demand whilst observing operating requirements
		3.2	Reactive power generation and voltage regulation requirements are assessed and the system is controlled to achieve the desired output
		3.3	Generator stabilities and operating limits are assessed and the system is controlled to maintain those limits in accordance with enterprise/site

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ELEMENT		PERFORMANCE CRITERIA	
			and manufacturer's procedures
		3.4	Generator cooling systems and limits are monitored and assessed, excitation system is controlled to maintain those limits in accordance with enterprise/site and manufacturer's procedures
4	Complete documentation	4.1	Documentation is updated and plant problems, movements, abnormalities and status are reported and logged in accordance with enterprise/site procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired controlling electrical energy production.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO457A Electrical energy production

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant environmental, occupational health and safety legislation and regulations
- Enterprise procedures
- Plant drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Relevant plant and equipment, its location and operating parameters
- Relevant state and territory regulations
- Electric motor types and characteristics
- Switchgear types and characteristics
- Electrical protection types and characteristics
- Electrical principles
- Process control principles
- Plant process control systems

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REQUIRED SKILLS AND KNOWLEDGE

- a.c. generators types and characteristics
- Transformers types and characteristics
- Generator excitation and cooling systems, types and characteristics types and characteristics
- Enterprise recording procedures
- Control and data acquisition systems
- Supervisory, alarm, protection and control equipment
- Principles of generator and system stability
- The systems components and interactions
- Auxiliary supply systems
- High voltage systems

T2 Specific skills needed to achieve the Performance Criteria:

- Interpret plant drawings and manufacturers manuals
- Apply relevant state and territory regulations
- Apply enterprise recording procedures
- Identify plant status
- Prepare plant/equipment for operation
- Organise resources
- Coordinate power generation
- Apply diagnostic and testing techniques
- Identify and respond to abnormal plant operating conditions
- Plan and prioritise work
- Use relevant hand tools
- Communicate effectively
- Apply data analysis techniques and tools
- Coordinate the operation of interacting systems
- Coordinate the operation of plant and equipment
- Maintain generator unit integrity
- Apply principles of electrical generation.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in

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EVIDENCE GUIDE

accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be ‘rich’ in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its ‘richness’. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in **9.2)**

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this unit

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti-Discrimination legislation, regulations, polices and workplace procedure
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The preparation and planning of work
  - The operation of generator and excitation systems
  - Coordination of unit operations
  - Analysing plant faults
  - Monitoring plant operation
  - Controlling system energy generation
  - The knowledge of generator and system stability principles

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

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- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working in limited spaces with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

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Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole, providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Systems, plant and equipment may include generator cooling systems; fuel delivery systems; generator and generator auxiliary plant; generator seal oil system; generation fire protection system; boiler, turbine and unit coordinated control systems; generator circuit breaker/transformer; unit auxiliary switchboards; electricity market auto loading systems; generator excitation systems which may include- d.c. pilot excitors and amplidyne(s) control, a.c. pilot excitors and thyristor control, brushless systems, static systems, associated supervisory, control and protection equipment; Circuit breakers, field, excitor, flashing, associated supervisory, control and protection equipment; Transformers, excitation, earthing and neutral, voltage and current; and automatic voltage regulator (AVR) system.

Safety standards may include relevant sections of Occupational Health and Safety legislation, enterprise safety rules, national standards for plant, relevant State and federal legislation and Australian standards.

Information and documentation sources may include verbal or written communications; enterprise safety rules documentation; enterprise operating instructions; equipment and alarm manuals; dedicated computer equipment; enterprise standing instructions and plant notes; enterprise log books; market load profile forecasts; electricity market bidding information; and manufacturer’s operation and maintenance manuals.

Technical and operational indicators may include stimuli (audio, smell, touch, visual), remote or local indicators and recorders, computers and alarms (visible and/or audible).

Communications may be by means of telephone, two way radio, pager, computer (electronic mail) and operating logs (written or verbal).

Tests may include supply change-over tests, “black” start tests and capability tests.

Appropriate personnel to consult, give or receive direction may include supervisor/team leader or equivalent; other coordinators of energy production; other operating staff; technical and engineering officers or equivalent; maintenance personnel; and contractor staff.

Operating environment may be remote from plant and equipment being operated; where operation is assisted by remote indicators of plant status and other parameters monitored; during night periods; during inclement or otherwise harsh weather conditions; and in wet/noisy/dusty areas.

Unit operations (systems requirements) may include normal generating models and system auto frequency control mode.

Faults and abnormal operating conditions may include unit trip; market distribution network disturbances; loss of station a.c. supplies; generator excitation/transformer;

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RANGE STATEMENT

CB faults/malfunctions; and unit coordinated controls malfunctions.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations

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UEPOPS501B Manage Occupational Health and Safety policy and procedures

Modification History

Release	Action	Core/Elective	Details	Points
2	Edit		Correct pre-requisite code and title UEENEEE117A Implement and monitor energy sector OHS policies and procedures	

Unit Descriptor

Unit Descriptor

1) Scope:

1.1) Descriptor

This competency standard unit deals with the skills and knowledge required to effectively manage the identification of hazards, assessment and control of risks associated with generating plant and equipment. Generating equipment may include: turbines, boilers and associated auxiliary plant and where appropriate, pressure vessels and plant effecting public safety.

Activities may include operation, maintenance, overhauling commissioning / de-commissioning, installation testing, use, and repair of generating plant and equipment.

Application of the Unit

Application of the Unit

2)

This unit describes generic Occupational Health and Safety competencies applicable for those with managerial responsibilities. It is expected that these competencies might be applicable in combination with other industry, occupation or workplace-specific competencies.

This unit is to be exhibited within the area of managerial responsibility which might be an entire enterprise or

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department of an enterprise. It involves the application of relevant Occupational Health and Safety legislation and codes of practice, particularly: general duty of care; requirements for the maintenance of records of occupational injury and disease; provision of information and training; those dealing with Occupational Health and Safety committees; health and safety representatives and issue resolution.

Relevant positions for implementing the Occupational Health and Safety system will include managers, supervisors, Occupational Health and Safety officer/manager and first aid officers.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace.

Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
UEENEEE117A	Implement and monitor energy sector OHS policies and procedures

Literacy and numeracy **4.2)**

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skills

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 5 Writing 5 Numeracy 5

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Identify hazards arising from the use plant and associated systems of work	1.1 Sources of information, data and advice on plant and equipment hazards are accessed to assist in identifying hazards associated with plant
	1.2 Hazards in the installation, commissioning / de-commissioning, use, maintenance, testing, dismantling, safe storage and disposal of plant and systems of work associated with plant are identified

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ELEMENT		PERFORMANCE CRITERIA	
		1.3	Requests for isolations are reviewed and determined appropriate for the work to be carried out
		1.4	Work environment, tasks and circumstances that may lead to hazardous situations or exacerbate risk associated with use of plant and equipment are identified and analysed
		1.5	Appropriate specialist advisors, stakeholders, relevant key personnel and other parties are identified and consulted in the process of hazard identification
		1.6	Appropriate procedures for recording and reporting on hazards associated with plant are established, reported and reviewed as part of the systematic approach to managing OHS
		1.7	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of on-the-job training
2	Analyse OHS risk associated with plant	2.1	The method of risk assessment is determined in consultation with operations staff and stakeholders and, if required specialist advisors.
		2.2	Risks associated with identified hazards arising from plant are assessed in consultation with operators and stakeholders, taking into account the effectiveness of existing controls
		2.3	Registers of control measures including permits, are developed and regularly updated for items of plant and associated equipment
3	Establish and maintain procedures for identifying hazards	3.1	Information, data and advice on risk control options for plant and equipment hazards are sourced
		3.2	Operators and stakeholders and key personnel are involved in the development of controls
		3.3	Measures for ensuring the health and safety of persons accessing, using and/or maintaining plant are adopted and controlled by applying the

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ELEMENT	PERFORMANCE CRITERIA	
		hierarchy of control
	3.4	Controls for risks associated with plant, including energy sources, access, egress, dangerous parts, guarding, operational controls, emergency stops and warning devices, registration and design of plant, and certification of operators are applied
	3.5	Workplace monitoring processes to eliminate or control risks are properly used and maintained
	3.6	Risks requiring further controls are identified and actioned
	3.7	Regular and appropriate reporting to stakeholders is undertaken
4 Identify and recommend controls for hazards associated with maintenance activities and continued safe use of plant and equipment	4.1	Stakeholders and key personnel are involved in the development of controls
	4.2	Circumstances are identified where permit to work procedures are required to isolate and assist in ensuring a safe working environment
	4.3	Permit to work and access procedures are responded to and monitored in liaison with relevant key personnel to assist in ensuring a safe working environment
	4.4	Isolation procedures are implemented and monitored in liaison with relevant key personnel to ensure continued safety of personnel
	4.5	The implications of Maintenance procedures are understood, documented and communicated to ensure plant and equipment are in a safe.
	4.6	Action is taken to ensure that any modifications to plant or equipment are safe and suitable for the task, appropriately return to service documentation and work practices are monitored and modified as required for safe operation
	4.7	Maintenance systems are monitored and evaluated for effectiveness, suitability and accuracy in ensuring safe operation of plant and

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ELEMENT		PERFORMANCE CRITERIA	
			equipment, and action taken as appropriate
5	Identify and advise on licensing and certification issues associated with plant and equipment	5.1	Types of plant (including plant design) requiring registration and tasks requiring operator licensing and / or authorisation are identified in accordance with legislative regulatory and enterprise requirements
		5.2	OHS requirements to meet plant registration, operator licensing and authorisation, and other regulatory requirements are reviewed and communicated to Managers and relevant key personnel
		5.3	Training requirements to meet licensing, authorisation, registration and other regulatory requirements are reviewed and communicated to Managers and key personnel
		5.4	Training needs are analysed to ensure information, instruction and training prior to commencement of work on new plant and equipment and new operating methods are in accordance with regulatory and enterprise requirements
		5.5	Where required, compliance with regulatory requirements for operator licensing, registration and authorisation is monitored and reported
		5.6	Appropriate records for statutory and specialist plant and associated operator competencies are identified, monitored, reviewed and maintained
6	Review and evaluate risk control measures for plant and equipment	6.1	Effectiveness of control measures are reviewed and monitored risk assessments conducted as appropriate
		6.2	Outcomes of OHS risk assessments are compared with criteria to identify risks requiring further risk control and risks deemed as low as reasonably achievable (ALARA)
		6.3	Stakeholders, key personnel and appropriate specialist advisors, are involved in developing relevant risk control plans for plant and equipment

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ELEMENT	PERFORMANCE CRITERIA	
	6.4	Appropriate records are maintained and reviewed for the duration of the installation, commissioning / de-commissioning, use, maintenance, testing, dismantling, safe storage and / or disposal of plant, equipment and systems of work.
	6.5	Improvements arising from the review process are recommended or implemented with appropriate key personnel including manufacturers
	6.6	The system of managing OHS is reviewed and reported to ensure continual plant safety

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired in managing Occupational Health and Safety policy and procedures.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO501B Occupational health and safety policy and procedures

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Introduction to and typical arrangements of power production plant
- Interpersonal skills techniques
- Stakeholder management techniques
- Time management techniques
- Leadership techniques
- Meeting leadership techniques
- Competency identification of team members
- Hazard identification and control techniques
- Licensing and certification requirements applicable to state and/or territory legislation including OHS, dangerous goods, hazardous substances and power generation regulatory requirements

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REQUIRED SKILLS AND KNOWLEDGE

- National Plant and Certification Standards
- Isolation, access, lock-out and Permit procedures
- Hierarchy of Control
- Relevant statutory legislation
- Relevant enterprise/site safety procedures including identification of hazards and controlling of risks
- Enterprise /site emergency procedures and techniques
- Environmental legislation
- Plant status
- Enterprise participative arrangements for Occupational Health and Safety
- Provision of Occupational Health and Safety training
- Maintenance of Occupational Health and Safety records

T2 Specific skills needed to achieve the performance criteria:

- Apply relevant Occupational Health and Safety regulations
- Apply hazard identification and control techniques
- Apply relevant statutory legislation
- Apply relevant enterprise/site safety procedures
- Apply enterprise /site emergency procedures and techniques
- Apply enterprise recording procedures
- Locate and/or identify relevant plant and equipment
- Identify plant status
- Develop and review standard operating procedures
- Conduct formal meetings and produce minutes
- Prepare written reports including recommendations
- Communicate effectively, , verbally and in writing
- Management / supervision of staff

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the range statement of the competency standard unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

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Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit **9.2)**

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered

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holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement OHS workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Evidence of detailed knowledge of all relevant OHS legislation and codes of practice and how they will be implemented within the area of responsibility is required
  - Evidence of understanding of the hierarchy of control (the preferred order or risk control measures from most to least preferred, that is, elimination, engineering controls, administrative controls and lastly, personal protective equipment) is required
  - Evidence of understanding of the significance of equal employment opportunity principles and practices for Occupational Health and Safety is required
  - Evidence of understanding of the significance of other management systems and procedures for Occupational Health and Safety is required
  - Evidence of knowledge of literacy levels and communication skills of employees in the area of managerial responsibility and consequent suitable communication techniques is required
  - Dealing with an unplanned event by drawing on Essential Knowledge and Skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

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Context of and specific resources for assessment **9.3)**

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified Essential Knowledge and Associated Skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the Essential Knowledge and Skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

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There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Involves application of relevant Occupational Health and Safety legislation and codes of practice, particularly: general duty of care; requirements for the maintenance of records of occupational injury and disease; provision of information and training; those dealing with Occupational Health and Safety committees; health and safety representatives and issue resolution.

Processes for consultation include Occupational Health and Safety committees; consultation with health and safety representatives; issuing resolution procedures; and participative/consultative procedures conducted by supervisory staff within the area of managerial responsibility.

Monitoring of activities may include review of written reports, performance appraisal or auditing procedures.

Hazardous events include accidents, fires and emergencies such as chemical spills or bomb scares. Procedures for dealing with them include evacuation, chemical containment and first aid procedures.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field 11)

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Competency Field **11)**

Operations.

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UEPOPS502B Manage permit to work system

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to manage the development implementation, and review of the permit to work system.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety.

Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only

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Prerequisite Unit(s) **4)**

after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
UEPOPS403B	Coordinate permit to work system.
UEPOPS402B	Conduct Multiple Energy Source Isolation Procedures for Permit to Work
UEENEEE101A	Apply Occupational Health Safety regulations, codes and practices in the workplace

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 5 Writing 5 Numeracy 5

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

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Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT		PERFORMANCE CRITERIA	
1	Plan for implementation of permit to work procedures	1.1	Statistical records are consulted to ascertain most favourable time for outage
		1.2	Requirements for the development of new procedures, as required, are identified and confirmed
		1.3	Identify key stakeholders and/or equipment affected
		1.4	Consultation with all key stakeholders to determine whether contingency plans require implementation and/or timetables require review is carried out in accordance with enterprise policy
		1.5	Disruptions to key stakeholders are minimised by providing alternative options.
2	Develop permit to work system and procedures	2.1	Procedures are researched, created, assessed and confirmed with the appropriate personnel
		2.2	Procedures are planned and developed in accordance with statutory, enterprise/site requirements
		2.3	Resources are identified, obtained and utilised for development of the work system
		2.4	Procedures are documented and approved in accordance with enterprise procedures
3	Manage permit to work system	3.1	Permit to work system incidents are identified
		3.2	Incidents are investigated and assessed

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ELEMENT	PERFORMANCE CRITERIA	
	3.3	Results and recommendations relating to incident investigations are documented and confirmed with the appropriate personnel and in accordance with enterprise procedures
4 Audit permit to work procedures	4.1	Permit to work system is audited, and results are evaluated in accordance with enterprise procedures
	4.2	Audit results are documented and reports/recommendations are confirmed with the appropriate personnel
	4.3	Recommendations relating to audit results are documented and confirmed with the appropriate personnel and in accordance with enterprise procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired managing permits to work systems.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO502B Manage permit to work system

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant environmental, occupational health and safety legislation and regulations
- Enterprise procedures
- Plant drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Relevant plant and equipment, its location and operating parameters
- Relevant state and territory regulations
- Interpersonal skills techniques

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REQUIRED SKILLS AND KNOWLEDGE

- Stakeholder management techniques
- Time management techniques
- Leadership techniques
- Hazard identification and control techniques
- Incident investigated techniques
- Plant status
- Enterprise recording procedures
- Computers and software
- Auditing procedures and techniques
- Investigation and evaluating techniques
- Communication principles

T2 Specific skills needed to achieve the performance criteria:

- Interpret plant drawings and manufacturers manuals
- Apply relevant state and territory regulations
- Relevant statutory legislation
- Relevant enterprise/site safety procedures
- Communicate effectively
- Apply data analysis techniques and tools
- Develop and manage permit to work systems
- Conduct Audits and review incident reports

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the range statement of the competency standard unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment	**9.1)**
	Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment

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intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline,

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work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:

- Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
- Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
- Demonstrate an understanding of the essential knowledge and associated skills as described in 6) of this unit
- Demonstrate an appropriate level of employability skills
- Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures

- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Knowledge and application of relevant sections of: OHS legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Ability to apply leadership skills
  - Ability to communicate effectively with the appropriate personnel and agencies following an emergency
  - Knowledge of potential hazards
  - Knowledge and application of fire-fighting and rescue principles and techniques
  - Ability to manage the Teams response to an emergency situation
  - Dealing with an unplanned event by drawing on Essential Knowledge and Skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this competency standard unit.

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Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the Essential Knowledge and Skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed

Nil	Assessment of this unit should also confirm that other competencies required to underpin this unit are satisfied.

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Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Appropriate personnel may include project engineers and leaders, maintenance personnel, operations personnel, internal and external specialist services personnel, line management, contractors and standing permit to work and/or safety committees.

Documentation may include Occupational Health and Safety and environmental legislation, industry standards, enterprise safety and/or permit to work rules, enterprise and site procedures, enterprise permit to work documentation/form(s), and computer based software packages.

Resources may include approved documentation/form(s), manpower, and computers.

Permit to work may include any approved documentation/form(s) controlled by the safety rules or permit to work procedures of the enterprise.

Incidents may refer to permit to work system breaches.

Auditing may include quantity, quality and suitability of permits and isolation procedures

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations.

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UEPOPS505B Produce maintenance strategies for generation production plant

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to undertake the establishment and implementation of maintenance strategies for generation production plant that may include boiler, turbine, hydro plant, electrical, control and monitoring, ash and dust; water treatment and fuel plant.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
UEPOPS425B	Produce maintenance plans for generation production plant.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 5 Writing 5 Numeracy 5

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

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Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Research and plan for strategies	1.1	Existing strategies are reviewed for maintenance requirements and directions
	1.2	Occupational Health and Safety standards, statutory requirements, relevant Australian standards, codes of practice, manufacturers specifications, environmental requirements and enterprise procedures are identified
	1.3	Enterprise and/or site business plans are reviewed for impact on maintenance work
	1.4	Major maintenance activities are identified with reference to scope and time frames
	1.5	Time frames of strategies and work are established
	1.6	Relevant indicators of performance are defined
	1.7	Cost estimating and economic evaluation principles are applied in order to identify maintenance costs
	1.8	Legal implications of work to be undertaken are identified
	1.9	Risk assessment principles are applied to determine strategic plans
	1.10	Desired outcomes for maintenance work are established
	1.11	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the

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ELEMENT	PERFORMANCE CRITERIA	
		provision of the on-the-job training
2 Establish strategies	2.1	Resources required to implement strategies are identified and detailed against projects
	2.2	Time frames and potential variances for maintenance scheduling are defined
	2.3	Interdependence of activities is identified and documented
	2.4	Planned objectives are documented in accordance with enterprise requirements
	2.5	Coordinated maintenance plans are documented and submitted in accordance with enterprise requirements
3 Implement strategies	3.1	Strategies and plans are implemented in order to facilitate required outcomes
	3.2	Strategies are implemented and variances are identified
	3.3	Corrective action to restore strategy objective is identified and established
	3.4	Strategies and plans are re-developed/ updated to satisfy outcomes
	3.5	Opportunities for strategy enhancements are identified and documented for inclusion in future strategy preparation

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired producing maintenance strategies for generation production plants.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

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REQUIRED SKILLS AND KNOWLEDGE

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO505B Maintenance strategies for generation production plant

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant environmental, occupational health and safety legislation and regulations
- Enterprise procedures
- Plant drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Relevant plant and equipment, its location and operating parameters
- Interpersonal skills techniques
- Stakeholder management techniques
- Time management techniques
- Leadership techniques
- Liaising with contractors and clients
- Project management techniques
- Project planning techniques
- Leadership techniques
- Contract management
- Liaising with contractors and clients
- Maintenance strategy development techniques
- Measurement and analysis system and procedures
- Maintenance philosophies and work practices
- Physical properties and failure modes of materials
- Engineering principles and development processes
- Business plan objectives and principles of application
- Computer systems
- Quality assurance/quality control
- Risk management techniques
- Maintenance panning principles

T2 Specific skills needed to achieve the performance criteria:

- Relevant environmental, occupational health and safety legislation and regulations
- Enterprise procedures
- Plant drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Relevant plant and equipment, its location and operating parameters
- Relevant state and territory regulations
- Apply risk management principles

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REQUIRED SKILLS AND KNOWLEDGE

- Apply quality assurance/quality control principles
- Prioritise options and work
- Solve problems
- Communicate effectively
- Analyse relevant information
- Apply data analysis techniques and tools
- Produce maintenance strategies
- Apply business planning principles
- Produce maintenance schedules and plans.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the range statement of the competency standard unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may

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be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti Discrimination

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legislation, regulations, polices and workplace procedures

- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Strategy development
  - Maintenance philosophies
  - Engineering principles
  - Risk management
  - Principles of planning
  - Dealing with an unplanned event by drawing on Essential Knowledge and Skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this competency standard unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

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Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the Essential Knowledge and Skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Generation production plant and equipment may include boiler, turbine, water, electrical, control and monitoring, ash and dust, water treatment and fuel plant (coal, oil, gas and water).

Strategies may target long, medium or short terms.

Budget may include costs for labour, materials, training, services, tools and equipment.

Reference information may include benchmarking reports, maintenance data, market requirements, plant budgets, business plans and risk assessment reports.

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RANGE STATEMENT

Communication may include liaison with customers such as plant owners and operating staff, maintenance staff and supervisors, professional risk analysts, external organisations and manufacturers.

Produced documents may include coordinated maintenance plans and/or strategies, maintenance scheduling documents, budgets, reports, submissions, cost benefit risk assessments and work plans and/or directives.

Preparation and implementation strategies may include use of the services of staff associated with maintenance and planning.

Power generation demands may include either long or short term prognosis.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations.

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UEPOPS507B Conduct project management

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to plan, implement, monitor and complete project work.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

Pre-Requisites

Prerequisite Unit(s) **4)**

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Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 5 Writing 5 Numeracy 5

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Plan and prepare	1.1	Work scope, desired outcomes, budget and key dates are identified
	1.2	Required resources and clients are identified, availability assessed, and allocated for effective management and completion of the project
	1.3	The preparation of technical specifications is coordinated and achieved within key dates
	1.4	Agreements with service providers and clients is coordinated and established within key dates
	1.5	An integrated overview plan is prepared and distributed for review by personnel involved in and/or influenced by the project
	1.6	Areas for potential over-run and resource complications are assessed
	1.7	Availability of up to date documentation, materials and equipment as referred to in specification, is ensured
	1.8	Communication processes such as regular meetings are organised to meet the needs of project clients/customers and service providers
	1.9	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2 Coordinate project plan	2.1	Plant isolation and access requirements are coordinated in accordance with statutory, industry and enterprise/site standards
	2.2	Specialist equipment and/or personnel are coordinated to achieve desired project outcomes
	2.3	Communication processes are executed to ensure adequate information flow
	2.4	Project progress and costs are regularly reviewed

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ELEMENT	PERFORMANCE CRITERIA	
		and compared with base-line plans
	2.5	Deviations from plan are identified and actions taken to recover original project program
	2.6	Deviations from original program requirements are reported to the appropriate personnel and when appropriate direction is sought
	2.7	Project is regularly reviewed in relation to safety, quality, resources, time frame, costs and equipment
3 Complete documentation	3.1	Quality assurance documents and outage reports are provided in accordance with statutory and enterprise/site requirements
	3.2	Plant and maintenance records are updated in accordance with enterprise/site requirements
	3.3	Plant availability is declared on completion of the project
	3.4	Project completion is reviewed against the established plan, and opportunities for future improvement are established and documented

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired conducting project management.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO507B Conduct project management

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant environmental, occupational health and safety legislation and

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REQUIRED SKILLS AND KNOWLEDGE

regulations

- Enterprise procedures
- Plant drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Relevant plant and equipment, its location and operating parameters
- Enterprise recording procedures
- Quality assurance and control procedures
- Enterprise financial and contractual procedures
- Project management principles and concepts
- Work scope coordination and preparation
- Interpersonal skills techniques
- Stakeholder management techniques
- Time management techniques
- Leadership techniques
- Liaising with contractors and clients
- Project management techniques
- Project planning techniques
- Leadership techniques
- Contractual principles

T2 Specific skills needed to achieve the performance criteria:

- Interpret plant drawings and manufacturers manuals
- Apply relevant state and territory regulations
- Identify interactions and conflict of plant and work scope
- Respond to deviations from original plans
- Apply quality assurance/quality control procedures
- Work scope coordination and preparation
- Manage human resources
- Communicate effectively
- Apply contractual procedures
- Monitor income and expenditure
- Manage time and resources
- Apply project management principles
- Contribute to/prepare project plans
- Coordinate a project plan.

Evidence Guide

EVIDENCE GUIDE

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EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the range statement of the competency standard unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

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Critical aspects of evidence required to demonstrate competency in this unit **9.2)**

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Knowledge of project management principles, the ability to apply project management principles, Business principles, Performing project management, Communicating effectively
  - Dealing with an unplanned event by drawing on Essential Knowledge and Skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

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Context of and specific resources for assessment **9.3)**

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this competency standard unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note: Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the Essential Knowledge and Skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

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There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Documentation may include job cards, budgets, cost centres, check sheets, safety rule procedures, plant records, drawings, quality assurance procedures and documentation, maintenance procedures and outage reports, codes of practice, and contract specifications.

Project management may include a set of interrelated activities, with defined start and end dates, designed to achieve a unique and common objective; the planning, organising, monitoring and controlling of all aspects of a project in a continuous process to achieve its objectives, both internal and external; and major project work.

Resources may include service providers, materials, plant, equipment, tools, finances and specialists.

Service providers may include but are not limited to internal staff and specialists, external specialists, contractors and contract specialists.

Finalisation of work agreements may include but is not limited to procurement procedures for period orders, fixed price and/or variable contracts, proprietary line contractors, internal and external service agreements and local/contract staff commitments.

Work performed to be in accordance with legislation and relevant codes of practice; Occupational Health and Safety, quality assurance (relevant Australian standard) and environmental legislation.

Coordination may include supplementary personnel, clients, service providers, plant and equipment.

Plant and equipment storage requirements may depend on length of the project and plant needs.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

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Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations.

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UEPOPS508B Manage commissioning decommissioning

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This competency standard unit deals with the skills and knowledge required to manage commissioning of plant and equipment and any subsequent decommissioning. It also involves detailed reporting of progress and completion of work against key indicators.

Commissioning / decommissioning refers to work of a significant nature where plant / equipment is required to meet manufacturer's performance specifications It may also include the commissioning and decommissioning of plant and equipment following overhaul or major refurbishment.

It does not cover the removing or returning plant to service under normal / routine maintenance situations.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However,

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License to practice **3)**

practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 5 Writing 5 Numeracy 5

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

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Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and prepare for the work	1.1 Work requirements are identified from request/work orders or equivalent and clarified/confirmed with appropriate parties or by detailed site inspection and commissioning / decommissioning meeting of stakeholders
	1.2 Occupational Health and Safety standards, statutory requirements, relevant Australian standards, codes of practice, manufacturers' specifications, environmental requirements and enterprise procedures are identified, applied and monitored throughout the work procedure
	1.3 Resources required to satisfy the work plan are identified, obtained and inspected for compliance with the job specifications
	1.4 Relevant plans, drawings and texts are selected and interpreted in accordance with the work plan
	1.5 Correct size, type and quantity of resources are determined, obtained and inspected for compliance with requirements.
	1.6 Work is planned in detail including sequencing and prioritising and considerations made where appropriate for the maintenance of plant security and capacity in accordance with system/site requirements
	1.7 Multiple coordination requirements, including requests for isolations and sequencing are resolved with others involved, affected or

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ELEMENT		PERFORMANCE CRITERIA	
			required by the work
		1.8	Potential hazards are identified and prevention and/or control measures are approved in accordance with procedures
		1.9	Work area is determined and approved in accordance with work / manufacturer's requirements and site procedures
		1.10	Teams and individuals roles and responsibilities are identified, clarified, prioritised and scheduled in accordance with requirements
2	Commission plant or equipment	2.1	Required isolations are confirmed where appropriate in accordance with site requirements
		2.2	Equipment is commissioned in conjunction with others involved in, or affected by, the work in accordance with the work plan
		2.3	Equipment is connected to energy and/or material sources in accordance with the work plan
		2.4	Equipment is commissioned in accordance with the work plan and specifications
3	Decommission plant or equipment	3.1	Required isolations are confirmed where appropriate in accordance with site requirements
		3.2	Equipment is decommissioned in conjunction with others involved in, or affected by, the work, in accordance with the work plan
		3.3	Equipment is disconnected from energy and/or material sources in accordance with the work plan
4	Remove / Disassembly of plant or equipment	4.1	Required isolations are confirmed, where appropriate, in accordance with site requirements
		4.2	Removal of plant / equipment or disassembly of major components, is carried out in conjunction with others involved in, or affected by, the work in accordance with the work plan
		4.3	Removal of plant / equipment or disassembly of

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ELEMENT	PERFORMANCE CRITERIA	
		major components, is carried out, mindful of the effect on other plant or structures, in accordance with the work plan
	4.4	Unused electrical conductors are isolated and terminated in accordance with the work plan Where applicable, unused electrical conductors / energy sources, are isolated and terminated in accordance with the work plan
	4.5	Other sources of energy or material are terminated and blanked in accordance with the work plan
5 Re-commission the plant or equipment	5.1	Plant is de-isolated in accordance with site requirements
	5.2	Pre-operational checks are carried out on plant according to manufacturer's recommendations and site requirements
	5.3	Sequence for re-commissioning procedures are strictly adhered to in accordance with the work plan
	5.4	Plant is tested for correct operation in accordance with manufacturer's and enterprise/site procedures
	5.5	Plant or equipment performance is monitored using appropriate methods and test equipment in accordance with the work plan
	5.6	Data is collected, interpreted and referenced against specifications and variances recorded
	5.7	Plant or equipment is adjusted to specifications using appropriate techniques in accordance with the work plan
	5.8	Final inspections and performance data collected to ensure compliance with manufacturers specifications
6 Complete the work	6.1	Work is completed and appropriate personnel are de-briefed in accordance with site/enterprise requirements

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ELEMENT	PERFORMANCE CRITERIA
	6.2 Work area is cleared of waste, cleaned, restored and secured in accordance with site/enterprise procedures
	6.3 Where applicable, specialist, tools and equipment are maintained and stored in accordance with site/enterprise/ manufacturers recommendations.
	6.4 Work completion details, including commissioning / decommissioning report and recommendations are finalised in accordance with site/enterprise procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired managing commissioning/decommissioning.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO508B Manage commissioning/decommissioning

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant environmental, occupational health and safety legislation and regulations
- Enterprise procedures
- Plant drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Relevant plant and equipment, its location and operating parameters
- Relevant state and territory regulations
- Principles of commissioning
- Conducting / controlling meetings with diverse groups
- Formal reporting procedures
- Manufacturer’s requirements for performance limits of plant and equipment

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REQUIRED SKILLS AND KNOWLEDGE

- Contingency Management
- Decommissioning procedures
- Re-commissioning procedures
- Test and measurement equipment

T2 Specific skills needed to achieve the performance criteria:

- Interpret plant drawings and manufacturers manuals
- Apply relevant state and territory regulations
- Apply decommissioning procedures
- Apply re-commissioning procedures
- Use test and measuring equipment
- Analyse relevant data
- Identify relevant plant or equipment
- Communicate effectively.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the range statement of the competency standard unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord

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with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as

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specified in the Performance Criteria and Range Statement
    - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) of this unit
    - Demonstrate an appropriate level of employability skills
    - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
    - Knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
    - Isolation procedures
    - Decommissioning procedures
    - Re-commissioning procedures
    - Communication principles
    - Dealing with an unplanned event by drawing on Essential Knowledge and Skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this competency standard unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of

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environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the Essential Knowledge and Skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Plant may include a complete generating set, e.g. boiler and associated systems, hydro plant, turbine and auxiliaries, feedwater systems, major sub-systems, e.g. mill groups, conveyor systems, draught and fuel air systems; electrical station and unit power systems, protection and upgrade of control equipment; hydraulic and pneumatic; and water treatment

Energy sources may include electrical, hydraulic, pneumatic, oil, gas and water.

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RANGE STATEMENT

Communications involves the conducting and recording of formal meetings of a broad range of stakeholders with diverse needs. Progress and completion reporting against key indicators.

Monitoring of activities may also include the development and review of test reports, analysing performance data and auditing procedures to ensure compliance with manufacturer's specifications and site/enterprise procedures.

Specifications or reference documentation includes operating, maintenance procedures, manuals, drawings, original equipment manufacturer data and performance statistics, statutory requirements and standards.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations.

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UEPOPS509B Manage quality control procedures

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to manage quality control procedures.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

Pre-Requisites

Prerequisite Unit(s) **4)**

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Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 5 Writing 5 Numeracy 5

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Plan for quality control	1.1	Occupational Health and Safety standards, statutory requirements, relevant Australian standards, codes of practice, manufacturers' specifications, environmental requirements and enterprise procedures are identified, applied and monitored throughout the work procedure
	1.2	Specifications are interpreted to meet customer need in accordance with standard procedures
	1.3	Products/work is tested or inspected to determine conformance with specifications
	1.4	Data is analysed and relevant information used to determine cause of quality variations
	1.5	Analytical process improvement tools are used to identify and solve quality problems
	1.6	Knowledge of process improvement techniques are used to facilitate work groups to assist in the identification and resolution of quality variances
	1.7	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2 Monitor quality control	2.1	Monitoring equipment is checked for correct calibration and environmental conditions confirmed to ensure reliability and accuracy of tests and results
	2.2	Quality control process improvement measures are implemented and monitored in accordance with standard operating procedures
	2.3	Deviation and fault data is collected and interpreted in accordance with standard operating procedures
	2.4	Changes in quality performance is noted and further action recommended where required in accordance with standard operating procedures

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ELEMENT		PERFORMANCE CRITERIA	
		2.5	Independent inspection, tests and audits are conducted, and design and servicing process monitored
		2.6	Quality improvement system is monitored and maintained in accordance with standard operating procedures
3	Complete documentation	3.1	Calibration records of test equipment maintained in accordance with standard operating procedures
		3.2	Updates of quality control process procedures are maintained in accordance with standard operating procedures
4	Audit quality control procedures	4.1	The quality system is audited, and results are evaluated in accordance with enterprise procedures
		4.2	Audit results are documented and reports/recommendations are confirmed with the appropriate personnel
		4.3	Recommendations relating to audit results are documented and confirmed with the appropriate personnel and in accordance with enterprise procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired managing quality control procedures.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO509B Quality control procedures

T1 Evidence shall show that knowledge has been acquired for safe working practices

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REQUIRED SKILLS AND KNOWLEDGE

of:

- Relevant environmental, occupational health and safety legislation and regulations
- Enterprise procedures
- Plant drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Relevant plant and equipment, its location and operating parameters
- Interpersonal skills techniques
- Stakeholder management techniques
- Time management techniques
- Leadership techniques
- Liaising with contractors and clients
- Project management techniques
- Relevant international and Australian standards,
- Quality control procedures, processes and techniques
- Statistical analysis
- Monitoring equipment
- Inspection techniques
- Data analysis

T2 Specific skills needed to achieve the performance criteria:

- Interpret plant drawings and manufacturers manuals
- Apply relevant international and Australian standards, statutory requirements and codes of practice
- Apply quality control procedures, processes and techniques
- Monitor quality control processes and techniques
- Perform statistical analysis
- Conduct inspections
- Identify variances to specifications
- Communicate effectively.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the range statement of the competency standard unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in

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EVIDENCE GUIDE

accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in **9.2)**

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this unit

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Knowledge and application of relevant sections of: OHS legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Application of quality control procedures, processes and techniques
  - Using specifications and manuals
  - Audit of Quality Procedures
  - Dealing with an unplanned event by drawing on Essential Knowledge and Skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice

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using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this competency standard unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the Essential Knowledge and Skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed

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Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Quality assurance and quality control standards may refer to international and Australian standards.

Customers may be internal or external.

Audit refers to internal audits.

Monitoring equipment may include precision measuring instrument such as micrometers, multimeter, oscilloscope and vernier callipers, pressure and temperature indicators/recorders and vibration monitors/recorders.

Environmental conditions may be affected by nearby plant or processes.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations.

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UEPOPS510B Monitor power generation plant reliability

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This competency standard unit deals with the skills and knowledge required to manage the determination of generating plant reliability through testing & data assessment

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 5 Writing 5 Numeracy 5

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the

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Evidence Guide.

Elements and Performance Criteria

ELEMENT		PERFORMANCE CRITERIA	
1	Collect data	1.1	Information is coordinated/collected in accordance with statutory, industry and enterprise/site requirements
		1.2	Plant is correctly identified and status established
		1.3	Tools and equipment are correctly identified and acquired
		1.4	Specialist assistance/equipment is sort when required
		1.5	Information is recorded and ranked in accordance with statutory, industry and enterprise/site requirements
		1.6	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training.
2	Perform calculations	2.1	Availability and performance calculations are performed in accordance with statutory, industry and enterprise/site requirements
		2.2	Calculations are checked for accuracy
3	Evaluate and analyse information	3.1	Analyse technical and operational information in a logical and sequential manner, and identify if abnormal plant operating condition/performance exists
		3.2	Causes of any abnormal plant reliability are identified
		3.3	Plant integrity is maintained through consultation and operational documentation
		3.4	The need for specialist assistance is determined

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ELEMENT	PERFORMANCE CRITERIA
4 Produce report and complete work	4.1 Information and data are coordinated and documented in accordance with requirements
	4.2 Reports are produced in accordance with statutory, industry and enterprise/site requirements
	4.3 Actions necessary to rectify loss of reliability are ranked and recommended to the appropriate personnel
	4.4 Implementation of recommendations are monitored to ensure plant reliability

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired monitoring power generation plant reliability.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO510B Monitor power generation plant reliability

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant environmental, occupational health and safety legislation and regulations
- Enterprise procedures
- Plant drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Relevant plant and equipment, its location and operating parameters
- Interpersonal skills techniques
- Stakeholder management techniques
- Time management techniques
- Leadership techniques
- Liaising with contractors and clients

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REQUIRED SKILLS AND KNOWLEDGE

- Data collection and analysing techniques
- Plant status
- Enterprise recording procedures
- Plant performance characteristics
- Control and data acquisition systems
- Computers and software
- Plant monitoring procedures

T2 Specific skills needed to achieve the performance criteria:

- Interpret plant drawings and manufacturers manuals
- Identify plant status
- Record, analyse and use data
- Apply problem solving techniques
- Communicate effectively
- Plan and prioritise work
- Write reports
- Apply data analysis techniques and tools
- Determine plant reliability performance.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the range statement of the competency standard unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment	**9.1)**
	Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the

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normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement OHS workplace procedures and practices

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including the use of risk control measures as specified in the Performance Criteria and Range Statement

- Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
- Demonstrate an understanding of the essential knowledge and associated skills as described in 6) of this unit
- Demonstrate an appropriate level of employability skills
- Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures

- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Dealing with an unplanned event by drawing on Essential Knowledge and Skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.
  - Knowledge and application of relevant sections of: Occupational Health and Safety legislation, statutory legislation, enterprise/site safety procedures and enterprise/site emergency procedures. Data acquisition systems, Evaluate and analyse data, Work completion procedures, reporting procedures

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this competency standard unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different

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structural/construction types and methods and in a variety of environments.

Method of assessment

9.4)

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the Essential Knowledge and Skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Sources of data may include; historical data of plant operation, Industry performance, standards, manufacturers performance specifications, outage and frequency statistics.

Information source may be verbal, written, computer based, logs, enterprise standards and procedures.

Specialist assistance may be sought from staff such as metallurgy, chemical, operating

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RANGE STATEMENT

and engineering staff.

Reports may be daily, weekly, quarterly and yearly; electronic, written or verbal.

Documentation may include site instructions, enterprise standing instructions, enterprise safety procedures, operating instructions, Occupational Health and Safety legislation, environmental legislation, operating and maintenance manuals, plans and diagrams.

Work site environment may be affected by nearby plant or processes, e.g. chemical, heat, noise and gas.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations.

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UEPOPS511B Tune process plant and equipment

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to complete the investigation, nomination and adjustments of tuning parameters associated with generation plant, equipment and processes.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 5 Writing 5 Numeracy 5

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the

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Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Plan and prepare	1.1	Tuning requirements are identified from relevant personnel and documentation
	1.2	Resource and equipment requirements are identified and obtained
	1.3	Tuning program is coordinated with the appropriate personnel and plant availability, capability and limitations are identified
	1.4	Testing and monitoring equipment are connected in accordance with test requirements and plant integrity
	1.5	Plant coordinated to initial operating state ready for testing in accordance with statutory, industry and enterprise/site procedure standards
	1.6	Test procedure and recording documentation are prepared
	1.7	Test equipment is calibrated in accordance with relevant standards and/or manufacturer's procedures
	1.8	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2 Test plant and implement tuning	2.1	Field instrumentation and control elements checked for calibration and correct operation in accordance with enterprise and manufacturer procedures
	2.2	Testing and tuning is performed in accordance with tuning program, variations are assessed and accommodated to enable test objectives to be met

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ELEMENT	PERFORMANCE CRITERIA	
	2.3	Results are analysed with reference to desired outcomes and new settings are determined
	2.4	Accuracy of test results is assessed in analysis of test data and corrections made as required
	2.5	Plant is retuned to achieve desired outcomes
3 Complete documentation	3.1	All relevant records and documentation are updated and retained in accordance with enterprise/site requirements
	3.2	Nominated changes to equipment operational settings are recommended to appropriate personnel
	3.3	Implementation of recommendations are monitored to ensure combustion efficiency

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired tuning process plants and equipment.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO511B Tune process plant and equipment

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant environmental, occupational health and safety legislation and regulations
- Enterprise procedures
- Plant drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Relevant plant and equipment, its location and operating parameters
- Valve, damper and actuator types and characteristics

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REQUIRED SKILLS AND KNOWLEDGE

- Electrical principles
- Process control principles
- Plant process control systems
- Interaction between multiple control loops
- Instrumentation principles and practices
- Instrument calibration techniques
- Enterprise recording procedures
- Plant processes and process dynamics
- Plant capability limitations
- Tuning processes and techniques
- Tuning algorithms

T2 Specific skills needed to achieve the performance criteria:

- Interpret plant drawings and manufacturers manuals
- Apply relevant statutory legislation
- Apply relevant enterprise/site safety procedures
- Apply enterprise/site emergency procedures and techniques
- Apply enterprise recording procedures
- Locate relevant plant and equipment
- Operate plant within design parameters
- Identify plant status
- Use enterprise documentation procedures
- Solve problems
- Set-up and use test/tuning equipment
- Coordinate testing operations
- Communicate effectively
- Prepare engineering programmes/ procedures/reports
- Analyse test results and translate to tuning settings for optimal system response
- Apply testing and tuning techniques
- Apply data analysis techniques and tools.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the range statement of the competency standard unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in

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EVIDENCE GUIDE

accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in **9.2)**

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this unit

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Planning for tuning procedures
  - Tuning processes and techniques
  - Testing and monitoring procedures
  - Work completion procedures
  - Dealing with an unplanned event by drawing on Essential Knowledge and Skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment **9.3)**

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This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this competency standard unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the Essential Knowledge and Skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with

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allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Generation plant to be tuned may include hydro plant, oil, gas or coal firing equipment; draft systems and associated systems; unit control equipment, turbine systems, steam and water systems; water treatment plant, dust collection plant; unit computer or distributive control systems.

Variables include age of plant, plant duty and varying ages of control equipment

Documentation may include; drawings, logic diagrams, function diagrams, plant records, testing procedures, plant notes, test equipment calibration certificates, manufacturer's operating and maintenance manuals; plant incident reports, specialist reports and manufacturer's recommendations.

Resources may include internal service groups, external specialists and specialised testing equipment.

Technical considerations may include control systems rate of change, plant overshoot/undershoot, plant capability/limitations, control system type and design.

Process considerations may include; pressure, level, flow, temperature, speed and vibration and mix.

Statutory requirements may include Occupational Health and Safety legislation, and environmental legislation.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

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Competency Field

Competency Field **11)**

Operations.

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UEPOPS512B Manage the network system

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This competency standard unit deals with the skills and knowledge required to manage a high voltage network/system (e.g. these systems may be interconnected, remote or isolated).

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
UEPOPS420B	Coordinate the network/system.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 5 Writing 5 Numeracy 5

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

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Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT		PERFORMANCE CRITERIA	
1	Plan and prepare network operations	1.1	Information and documentation to determine network/system status is assessed and evaluated in accordance with system requirements
		1.2	Network/system and associated equipment operational pre-requisites are established in accordance with enterprise/system procedures
		1.3	Sequence for operation of the network sections and equipment are created to suit a range of scenarios in accordance with enterprise/system procedures
		1.4	Forecast prediction is based on the accurate interpretation and assessment of relevant information in accordance with system procedures
		1.5	Network/system limitations and performance due to location and external influences are evaluated
		1.6	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2	Manage and control network /system	2.1	Network/system is operated in accordance with enterprise/system operating procedures
		2.2	Network/system demand is met with contingencies in place to maintain quality of supply standards in accordance with statutory requirements

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ELEMENT		PERFORMANCE CRITERIA	
		2.3	Network/system voltage and current requirements are assessed, evaluated and controlled to maintain stability and system integrity
		2.4	Voltage/load profiles are identified and adhered to minimising transmission losses
		2.5	Network/system load shedding sequence and priorities are monitored to ensure system integrity
		2.6	Network/system data is monitored for normal operation or to detect deviations
		2.7	Corrective actions to rectify abnormalities are implemented following assessment of data in accordance with system procedures
		2.8	Resources required to meet system requirements are managed in accordance with system procedures
		2.9	Where required, operations are carried out in consultation with team members
3	Analyse and respond to network/ system faults or incidents	3.1	Causes of abnormal network/system operating conditions are identified by analysing the technical and operational information in a logistical and sequential manner
		3.2	Operation of protection systems are evaluated to determine the nature and cause of fault conditions
		3.3	Communication may be established with other authorities and/or key stake holders to identify nature/source of system interference
		3.4	Corrective action is taken in accordance with enterprise/system procedures
		3.5	Network/system integrity and personnel safety are maintained through consultation with appropriate personnel and reference to plant technical, operational documentation and contingency plans

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ELEMENT	PERFORMANCE CRITERIA
4 Review incident response and preventative procedures	4.1 Incident responses are assessed and reviewed in accordance with system procedures
	4.2 Alternative responses/contingencies are identified and assessed in accordance with system procedures
	4.3 Alternative responses/contingencies are documented and approved in accordance with system procedures
5 Complete documentation	5.1 Documentation is updated, log sheets maintained and equipment/system problems, movements abnormalities and status are reported and logged in accordance with enterprise/site procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired managing the network/system.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO512B Manage the network/system

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant environmental, occupational health and safety legislation and regulations
- Enterprise procedures
- Plant drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Relevant plant and equipment, its location and operating parameters
- Switchgear types and characteristics
- Electrical protection types and characteristics
- Electrical principles
- a.c. generators types and characteristics
- Transformers types and characteristics

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REQUIRED SKILLS AND KNOWLEDGE

- Relevant state and territory regulations
- Plant status;
- Enterprise recording procedures;
- System/Network types and characteristics;
- Contingency plans
- Problem solving techniques
- Supervisory, alarm, protection and control equipment;
- Load shedding principles;
- Control and data acquisition systems;
- Computers and software;
- Switching practices and procedures

T2 Specific skills needed to achieve the performance criteria:

- Interpret plant drawings and manufacturers manuals
- Apply relevant state and territory regulations
- Apply relevant statutory legislation;
- Apply relevant enterprise/site safety procedures;
- Apply enterprise/site emergency procedures and techniques;
- Apply enterprise recording procedures;
- Manager and control system/network;
- Identify plant status;
- Communicate effectively;
- Apply data analysis techniques and tools;
- Identify and respond to abnormal system operating conditions;
- Plan and prioritise work; ;
- Apply stress management techniques;
- Direct and coordinate personnel;
- Select appropriate load shedding;
- Apply diagnostic techniques.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the range statement of the competency standard unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

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Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit **9.2)**

Before the critical aspects of evidence are considered all

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pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each eleme and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement OHS workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Knowledge and application of relevant sections of: OHS legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Relevant system type
  - Preparing for system operations
  - Managing and controlling a Network/System operation
  - Coordination requirements
  - Analysing and responding to faults and abnormal system operating conditions
  - Impact of actions
  - Dealing with an unplanned event by drawing on Essential Knowledge and Skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice

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using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this competency standard unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines. Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the Essential Knowledge and Skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed

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Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Safety standards may include relevant sections of Occupational Health and Safety legislation, enterprise safety rules, relevant state and federal legislation and national standards for plant

Information and documentation sources may include verbal or written communications; enterprise safety rules documentation; enterprise operating instructions; dedicated computer equipment; enterprise/site standing and operating instructions; enterprise log books; manufacturer's operation and maintenance manuals; and equipment and alarm manuals

Systems may be interconnected, remote or isolated

Technical and operational indicators may include local indicators and recorders, computers and alarms (visible and or audible)

Key indicators may include voltage, current, reactive power flows, load, equipment loading limits, system node points, frequency and plant status

Communications may be by means of telephone, two way radio, pager, computer (electronic mail) and operating logs (written or verbal)

Appropriate personnel, team members/other authorities may include supervisor/team leader or equivalent, power plant operations personnel or equivalent, technical and engineering officers or equivalent, maintenance staff, other operating staff or equivalent, system controller, field operators, restricted operators, emergency personnel, network controllers/coordinators, generation controllers, plant operators, field operators, support staff, fire service, police, ambulance, emergency services, enterprise and site representatives, consumers and independent power producers

Equipment may include machines, circuit breakers, tap changers, protection settings, capacitor/condenser banks, generators and SCADA systems

Voltage control may be synchronous compensator, generation VAR output, capacitor/condenser, switchgear, tap changers and network configuration

System integrity may be affected by machine and system stability, transmission line and transformer overloading, correct tap changer position, protection settings, voltage transformer selection, synchronising, required load shedding selected, capacitor/condenser bank selection, loss of network and generation components

System limitations may include location, weather conditions, natural disasters,

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RANGE STATEMENT

accidents, temperature and power swings

Contingencies may include responsive spinning reserve, spare/stand-by plant and load shedding

Types of incidents may include localised blackout, interconnected/isolated power system potential power system threat, accidents, life threatening situations, generation plant and auxiliary plant faults/failure, loss of network and generation components

Team members/other authorities may include network controllers/coordinators, generation controllers, plant operators, field operators, support staff, fire service, police, ambulance, emergency services, enterprise and site representatives, consumers and independent power producers

System condition may be voltage profiles, spare plant, generation/transmission capability limits, deviation from generation schedule, variation from normal trends, plant testing, switching programs and responsive spinning reserve

Unit operations may include spurious faults in automatic systems, automatic systems operating out of range, failure of automatic system components and routine plant movement.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations.

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UEPOPS513B Manage operational crisis to maintain/restore power system integrity

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to manage a crisis of a magnitude which affects the integrity and effectiveness of the system.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 5 Writing 5 Numeracy 5

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the

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Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Identify crisis	1.1	Crisis and probable implications are identified and assessed in accordance with enterprise procedures
	1.2	Secondary threats to situation are identified and monitored in accordance with enterprise procedures
	1.3	The system configuration and/or generation capability is evaluated in accordance with enterprise procedures
	1.4	Data determining network/system and/or generation status is assessed and evaluated in accordance with enterprise procedures
	1.5	External information is received, collated and assessed in accordance with enterprise procedures
	1.6	Probable cause of crisis is identified from available information and resources
	1.7	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2 Establish contingency plan	2.1	Contingency plans are identified using relevant enterprise documentation and procedures
	2.2	Requirements for additional resources are identified in accordance with enterprise procedures
	2.3	Alternate contingencies to cater for crisis variations are developed in consultation with team members
3 Establish	3.1	Communication links with appropriate external authorities for coordination of their resources are

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ELEMENT		PERFORMANCE CRITERIA	
	communications		established in accordance with enterprise procedures
		3.2	Communication with appropriate key stake holders is established to disseminate information in accordance with enterprise procedures
		3.3	Customers are dealt with in accordance with enterprise policy and procedure
		3.4	Team roles, both internal and external, are identified and conveyed to appropriate personnel in accordance with enterprise procedures
4	Manage crisis	4.1	Response is managed in accordance with enterprise/site requirements and allowances for personnel/equipment limitations are made
		4.2	Events and responses are prioritised taking into account needs of stake holders in accordance with enterprise procedures
		4.3	Impact of secondary threats are identified and assessed in accordance with enterprise procedures
		4.4	Contingency plans are actioned in accordance with enterprise/site policy and procedure
		4.5	Additional resources are coordinated and directed in accordance with enterprise procedures
		4.6	Restoration strategies are monitored, evaluated and adjusted as necessary in accordance with enterprise procedures
		4.7	Systems are stabilised and integrity maintained in accordance with enterprise procedures
5	Document and review crisis and response	5.1	Equipment failure/problems are recorded and processed in accordance with enterprise procedures
		5.2	Feedback from stake holders is recorded and analysed in accordance with enterprise procedures

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ELEMENT	PERFORMANCE CRITERIA
	5.3 Required reports and findings are generated and distributed to appropriate personnel in accordance with enterprise procedures
	5.4 Improvements to the crisis management process are recommended to the appropriate parties in accordance with enterprise procedures
	5.5 Alternative contingencies are analysed and recommendations are communicated to appropriate personnel in accordance with enterprise procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired managing operational crisis to maintain / restore power system integrity.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO513B Operational crisis to maintain/restore power system integrity

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant environmental, occupational health and safety legislation and regulations
- Enterprise procedures
- Plant drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Relevant plant and equipment, its location and operating parameters
- Interpersonal skills techniques
- Stakeholder management techniques
- Leadership techniques
- Liaising with contractors and clients
- Plant status
- Enterprise recording procedures

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REQUIRED SKILLS AND KNOWLEDGE

- Supervisory, alarm, protection and control equipment
- Computers and software
- Communication equipment
- Communication principles

T2 Specific skills needed to achieve the performance criteria:

- Interpret plant drawings and manufacturers manuals
- Apply relevant statutory legislation
- Apply relevant enterprise/site safety procedures
- Apply enterprise/site emergency procedures and techniques
- Apply enterprise recording procedures
- Apply relevant state and territory regulations
- Apply enterprise recording procedures
- Identify plant status
- Communicate effectively
- Apply diagnostic techniques
- Apply data analysis techniques and tools
- Recognise abnormal plant operating conditions
- Apply or determine appropriate corrective actions required
- Plan and prioritise work
- Interpret remote indication of plant status and condition
- Delegate to and manage staff
- Apply stress management techniques.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the range statement of the competency standard unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment	**9.1)**
	Longitude competency development approaches to assessment,

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such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also

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comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Knowledge of emergency procedures
  - Knowledge of the roles of external authorities/bodies
  - Ability to establish and control emergency situations
  - Ability to apply tactical decision making techniques
  - Dealing with an unplanned event by drawing on Essential Knowledge and Skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this competency standard unit.

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Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the Essential Knowledge and Skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed

Nil

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Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Safety standards may include relevant sections of Occupational Health and Safety legislation, relevant state and federal legislation, national standards for plant and enterprise safety rules

Information and documentation sources may include verbal or written communications; enterprise safety rules documentation; enterprise operating instructions; dedicated computer equipment; enterprise/site standing and operating instructions; enterprise log books; manufacturer's operation and maintenance manuals; equipment and alarm manuals and external stake holder agreements

Communications may be by means of telephone, two way radio, pager, computer (electronic mail), operating logs (written or verbal) and intercoms

Appropriate personnel for consultation, to give or receive direction may include supervisor/team leader or equivalent, power plant operations personnel or equivalent, technical and engineering officers or equivalent, maintenance staff, power plant operations personnel, police, fire brigade, ambulance, emergency services, interconnected equipment personnel, public relations, management and system/network controllers

Operating environment may be remote from plant and equipment being operated (operation is assisted by remote indicators of plant status and other parameters monitored) during inclement or otherwise harsh weather conditions, in wet/noisy/dusty areas, during night periods, continuous operation, during periods of stress, fatigue, work pressures, external influence (plant and people) and during high level intense work environment

Types of incidents may include blackout, interconnected/isolated power system potential power system threat, disasters, accident, life threatening situations, generation plant and auxiliary plant faults/failures, system blacks, cyclone, multiple faults, floods, secondary threats, high winds and extreme electrical storms

Key indicators are voltage, current, reactive power flows, load, equipment, loading limits, system node points and appropriate external indicators, e.g. radar

System implications are machine and system stability, transmission line and transformer overloading, correct tap changer position, protection settings, voltage transformer selection, synchronising, required load shedding selected and capacitor/confessor bank selection

System conditions may be: voltage profiles, spare plant, generation/transmission capability limits, variation from normal trends and switching

Documentation may include policy, procedure, standard operating instructions, contingency plans and emergency switching programs

Liaison with key stake holders may be system/network controllers/coordinators,

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RANGE STATEMENT

oncoming shift change, field operators, support staff, asset centres, patrolmen, customers, other government bodies, co-generation authorities, generation plant operators, on call staff, police, fire, emergency services, private systems and independent power producers

Post incident debrief may be probable fault/failure cause, strategic/contingency plan, environmental implications, economic factors, policy, procedure, training, safety factors and emergency switching programs

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations.

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UEPOPS514B Control hydro generation pumping

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to undertake remote control of hydro plant.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

Pre-Requisites

Prerequisite Unit(s) **4)**

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Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 5 Writing 5 Numeracy 5

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT		PERFORMANCE CRITERIA	
1	Maintain key indicator limits	1.1	Pond levels, station discharges, machine voltage and current limits, frequency, time error (where applicable) are maintained in accordance with manufacturer's specifications and enterprise requirements
		1.2	Hydro plant is run at peak efficiency, or to the load schedule avoiding rough running zones in accordance with enterprise procedures
		1.3	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2	Operate remote hydro plant	2.1	Machines are remotely stopped, started, loaded and unloaded in accordance with the operating regimes dictated by the generation schedule
		2.2	Plant is remotely switched in and out of synchronous condenser operation (where required) in accordance with system requirements
3	Maintain policy and procedure	3.1	Procedures to alert public of increased river flows are adhered to in accordance with site/enterprise procedures
		3.2	Minimum river flows are maintained in accordance with agreed limits
		3.3	Water storage levels are monitored and maintained in accordance with statutory or policy guidelines
4	Complete documentation	4.1	Documentation is updated, maintained and equipment problems, movements, abnormalities and status are reported and logged in accordance with enterprise/site procedures

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired controlling hydro generation / pumping.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO514B Hydro generation/pumping

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant environmental, occupational health and safety legislation and regulations
- Enterprise procedures
- Plant drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Relevant plant and equipment, its location and operating parameters
- Relevant state and territory regulations
- Electric motor types and characteristics
- Pump and compressor types and characteristics
- Valve, damper and actuator types and characteristics
- Switchgear types and characteristics
- Electrical protection types and characteristics
- Electrical principles
- Transformers types and characteristics
- tail races, types and characteristics
- Dam, types and characteristics
- Principles of hydro electric generation
- Hydro turbine, types and characteristics
- Hydro turbine governor, types and characteristics
- Hydro generator types and characteristics
- Bypass and relief valves, types and characteristics
- Auxiliary plant, types and characteristics
- Equipment status
- Enterprise recording procedures
- Communication principles
- Computers and software

T2 Specific skills needed to achieve the performance criteria:

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REQUIRED SKILLS AND KNOWLEDGE

- Interpret plant drawings and manufacturers manuals
- Apply relevant state and territory regulations
- Apply enterprise recording procedures
- Operate plant within design parameters
- Identify plant status
- Prepare plant/equipment for operation
- Communicate effectively
- Apply data analysis techniques and tools
- Recognise abnormal plant operating conditions
- Apply or determine appropriate corrective actions required
- Plan and prioritise work
- Interpret remote indication of plant status and condition

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the range statement of the competency standard unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by

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various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge

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and associated skills as described in 6) of this unit
- Demonstrate an appropriate level of employability skills
- Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures

- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Knowledge and application of relevant sections of: OHS legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Knowledge of procedures that affect recreational, rural and commercial users of waterways and storages
  - Operation of remote hydro plant
  - Dealing with an unplanned event by drawing on Essential Knowledge and Skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this competency standard unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

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Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the Essential Knowledge and Skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Safety standards may include relevant sections of Occupational Health and Safety legislation, enterprise safety rules, relevant state and federal legislation and national standards for plant

Information and documentation sources may include verbal or written communications; enterprise safety rules documentation; enterprise operating instructions; dedicated computer equipment; enterprise/site standing and operating instructions; enterprise log books; manufacturer’s operation and maintenance manuals; and equipment and alarm manuals

Communications may be by means of telephone, two way radio, pager, computer

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RANGE STATEMENT

(electronic mail) and operating logs (written or verbal)

Appropriate personnel for consultation, to give or receive direction may include supervisor/team leader or equivalent, power plant operations personnel or equivalent, technical and engineering officers or equivalent, maintenance staff, other operating staff or equivalent, system controller/network controller, field operator and restricted H.V. operators

Operating environment may be remote from plant and equipment being operated and operation is assisted by remote indicators of plant status and other parameters monitored

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations.

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UEPOPS515B Coordinate power generation

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to coordinate operation and control of multiple generators sharing load under the control of one operator.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

Pre-Requisites

Prerequisite Unit(s) **4)**

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Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 5 Writing 5 Numeracy 5

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan for plant operation	1.1 Safety issues are identified to comply with enterprise/site requirements
	1.2 Work, plant and resource requirements are identified from relevant information and documentation
	1.3 Pre operational checks are carried out in accordance with enterprise and site requirements
	1.4 Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2 Operate generator and excitation system	2.1 System is operated in accordance with enterprise/site and manufacturer's operating procedures
	2.2 Synchronising requirements are assessed, evaluated and achieved to ensure machine/system stability during synchronising
	2.3 System is monitored and observed to detect deviations from normal operating conditions
	2.4 Corrective actions are taken to rectify abnormalities in accordance with manufacturer's and enterprise/site procedures
3 Control generation of electrical energy	3.1 Generator output is adjusted to meet demand whilst observing operating requirements
	3.2 Reactive power generation and voltage regulation requirements are assessed and the system is controlled to achieve the desired output
	3.3 Generator stabilities and operating limits are assessed and the system is controlled to maintain those limits tin accordance with enterprise/site and manufacturer's procedures
	3.4 Generator cooling systems and limits are

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ELEMENT		PERFORMANCE CRITERIA	
			monitored and assessed and excitation system is controlled to maintain those limits in accordance with enterprise/site and manufacturer's procedures
4	Coordinate generation control	4.1	Load sharing between multiple generators is controlled to maintain optimum efficiency and plant reliability
		4.2	Output of generators is adjusted to meet demand whilst observing operating requirements
		4.3	System/plant key indicators are monitored and adjusted to maintain within limits and detect deviations from normal operating conditions
		4.4	Corrective actions taken to rectify system abnormalities are in accordance with manufacturer's, enterprise/site requirements
		4.5	System integrity, personal safety and continuity of supply are maintained throughout.
		4.6	Consultation with appropriate personnel is undertaken as required in accordance with enterprise/ site requirements.
		4.7	Systems are operated at optimum efficiency
5	Monitor system/plant	5.1	System/plant to be monitored is physically identified
		5.2	System/plant is monitored for normal operation or to detect deviations
		5.3	Corrective action taken is in accordance with enterprise/site procedures
		5.4	Appropriate personnel are notified when defects and abnormal operating conditions are detected
6	Analyse system/plant faults	6.1	Causes of abnormal system operating conditions are identified by analysing the technical and operational information in a logical and sequential manner
		6.2	Actions necessary to rectify fault are correctly determined

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ELEMENT		PERFORMANCE CRITERIA	
		6.3	System/plant integrity and personnel safety are maintained through consultation with appropriate personnel, and reference to plant, technical and operational documentation
		6.4	Appropriate personnel are arranged for local investigation of identified operational abnormalities
7	Complete documentation	7.1	Documentation is updated and plant problems, movements, abnormalities and status are reported and logged in accordance with enterprise/site procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired co-ordinating power generation.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO515B Power generation

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant environmental, occupational health and safety legislation and regulations
- Enterprise procedures
- Plant drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Relevant plant and equipment, its location and operating parameters
- Relevant state and territory regulations
- Electric motor types and characteristics
- Switchgear types and characteristics
- Electrical protection types and characteristics
- Electrical principles

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REQUIRED SKILLS AND KNOWLEDGE

- Process control principles
- Plant process control systems
- a.c. generators types and characteristics
- Transformers types and characteristics
- Generator excitation and cooling systems, types and characteristics types and characteristics
- Plant status
- Enterprise recording procedures
- Systems components and interactions

T2 Specific skills needed to achieve the performance criteria:

- Interpret plant drawings and manufacturers manuals
- Apply relevant state and territory regulations
- Apply enterprise recording procedures
- Identify plant status;
- Prepare plant/equipment for operation
- Communicate effectively
- Coordinate the operation of plant and equipment
- Maintain generator unit integrity
- Apply principles of electrical generation
- Apply data analysis techniques and tools
- Recognise abnormal plant operating conditions
- Apply or determine appropriate corrective actions required
- Plan and prioritise work
- Coordinate the operation of equipment to maintain plant integrity, personnel safety and continuity of supply
- Coordinate the operation of equipment to maintain optimum efficiency
- Interpret remote indication of plant status and condition

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the range statement of the competency standard unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

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Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit **9.2)**

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered

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holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Planning and preparing for one operator isolated plant operations
  - Operating generator and excitation systems
  - Controlling and coordinate generation of electrical energy
  - Analysing system faults
  - Dealing with an unplanned event by drawing on Essential Knowledge and Skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

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- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this competency standard unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the Essential Knowledge and Skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed

Nil

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Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Key indicators may include frequency time error, bus voltage, machine/ equipment voltage and current limits, plant temperatures, reactive power flows, power factor, generation plant load capabilities, protection settings, visual and audible indicators, analogue and digital displays and load shedding requirements.

Systems, plant and equipment may include generator cooling systems; fuel delivery system; generator and generator auxiliary plant; generator excitation system; generation fire protection system; unit coordinated control system; generator circuit breaker/transformer; unit auxiliary switchboards; electricity market auto loading procedures prime mover governing system.

Safety standards may include relevant sections of Occupational Health and Safety legislation, enterprise safety rules, and national standards for plant, relevant state and federal legislation and Australian standards.

Information and documentation sources may include verbal or written communications; enterprise safety rules documentation; enterprise operating instructions; equipment and alarm manuals; dedicated computer equipment; enterprise standing instructions and plant notes; enterprise log books; market load profile forecasts; electricity market bidding information; and manufacturer’s operation and maintenance manuals.

Technical and operational indicators may include stimuli (audio, smell, touch, visual), remote or local indicators and recorders, computers and alarms (visible and or audible).

Communications may be by means of telephone, facsimile, two way radio, pager, computer (electronic mail) and operating logs (written or verbal).

Appropriate personnel for consultation, to give or receive direction may include supervisor/team leader or equivalent; other coordinators of energy production; other operating staff; technical and engineering officers or equivalent; maintenance personnel; and contractor staff.

Operating within an isolated system the environment may be remote from plant and equipment being operated; (operation is assisted by remote indicators of plant status and other parameters monitored); during night periods; during inclement or otherwise harsh weather conditions; and in wet/noisy/dusty areas.

Unit operations (systems requirements) may include spurious faults in automatic systems operating out of range, failure of automatic system components and routine plant movement.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information

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RANGE STATEMENT

and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations.

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UEPOPS520A Evaluate cost estimations and initiate appropriate solutions

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to evaluate cost estimations for planned and forced plant outages (plant may be a single item or whole unit) and to initiate appropriate solutions.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
UEENEEC005B	Estimate electrotechnology projects

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 5 Writing 5 Numeracy 5

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

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Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT		PERFORMANCE CRITERIA	
1	Evaluate work details	1.1	Work plan and methods are evaluated including preparation and re-commissioning
		1.2	Time frame of work is analysed including required working patterns
		1.3	Details of materials, equipment, specialist services and contractual provisions are analysed
		1.4	Any specific disposal requirements are evaluated
		1.5	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2	Identify costs	2.1	Costs associated with the outage are evaluated in accordance with appropriate procedures
		2.2	Previous planned and forced outages are analysed to determine problem areas
		2.3	Possible problem areas are evaluated
3	Develop solutions	3.1	Potential solutions to limit time frame over runs are identified
		3.2	Potential variations in work scope are identified and solutions developed
4	Complete documentation	4.1	Evaluation report documentation is produced in accordance with appropriate procedures
		4.2	Possible problem areas are documented and produced in accordance with appropriate procedures

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired evaluating cost estimations and initiating solutions.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO520A Cost estimations and appropriate solutions

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant environmental, occupational health and safety legislation and regulations
- Enterprise procedures
- Plant drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Relevant plant and equipment, its location and operating parameters
- Enterprise recording procedures
- Costing and quotation techniques and procedures
- Employment awards and agreements
- Penalty and transfer pricing procedures and systems
- Enterprise evaluation procedures

T2 Specific skills needed to achieve the Performance Criteria:

- Interpret plant drawings and manufacturers manuals
- Apply relevant state and territory regulations
- Apply enterprise recording procedures
- Communicate effectively
- Apply data analysis techniques and tools
- Compile data
- Identify cause and consequence of potential cost excursions
- Produce quotations
- Produce cost options
- Develop solutions

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Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be ‘rich’ in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its ‘richness’. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

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Critical aspects of evidence required to demonstrate competency in this unit **9.2)**

Before the critical aspects of evidence are considered all prerequisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - employability skillsConduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedure
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Costing and quotation techniques and procedures
  - Employment awards and agreements
  - Penalty and transfer pricing procedures and systems
  - Data analysis
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above

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listed items.

Context of and specific resources for assessment **9.3)**

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working in limited spaces with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and **9.5)**

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relationship with other units

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole, providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Documentation may include drawings, material lists, maintenance methods and plans, spare parts information, specifications and quotes.

Resources may include internal and external service providers and personnel.

Costed work may be in accordance with the following legislation: Occupational Health and Safety; quality assurance standards; environmental, enterprise/site standards and agreements.

Costs may include labour, spares, specialist services, disposal of waste and contractual costs, various options are: schedule of rates, period of quote validity and variations from original specification detailed.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations

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UEPOPS523A Manage critical incidents

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit refers to the management of incidents of a critical nature that may impact on the operational effectiveness of the plant or system, endanger human life or property, or have an adverse impact on the environment.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
UEPOPS369A	Respond to a critical incident
UEPOPS454A	Coordinate response to critical incidents

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 5 Writing 5 Numeracy 5

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

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Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT		PERFORMANCE CRITERIA	
1	Identify critical incident and consequences	1.1	Critical incidents and probable implications are identified and analysed in accordance with enterprise procedures
		1.2	Secondary threats to situation are identified and monitored
		1.3	Data is evaluated to determine probable causes, consequences and potential responses
		1.4	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training.
2	Establish contingency plan	2.1	Contingency plans are identified using relevant enterprise documentation, data and procedures
		2.2	Requirements for additional resources are identified
		2.3	Alternate contingencies to cater for crisis variations are developed in consultation with team members
3	Establish communications	3.1	Communication links with appropriate external authorities for coordination of their resources are established
		3.2	Communication with appropriate key stakeholders is established to disseminate information
		3.3	Team roles, both internal and external, are designated and conveyed to appropriate personnel in accordance with enterprise

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ELEMENT	PERFORMANCE CRITERIA	
		procedures
4 Manage critical incident	4.1	Response is managed in accordance with enterprise/site requirements and allowances for personnel/equipment limitations are made
	4.2	Events and responses are prioritised taking into account needs of stakeholders
	4.3	Implications of personnel and key stakeholder actions are monitored and analysed
	4.4	Impact of secondary threats are identified and assessed
	4.5	Contingency plans are actioned in accordance with enterprise/site policy and procedure
	4.6	Additional resources are coordinated and directed in accordance with enterprise procedures
	4.7	Restoration strategies are monitored, evaluated and adjusted as necessary
5 Document and review incident and response	5.1	Equipment failure/problems are recorded and processed in accordance with enterprise procedures
	5.2	Feedback from stakeholders is recorded where necessary and analysed in accordance with enterprise procedures
	5.3	Required reports, findings and alternative preventative measures are generated and distributed to appropriate personnel in accordance with enterprise procedures
	5.4	Improvements to the critical incident management process are recommended and approved in accordance with enterprise procedures
	5.5	Alternative contingencies are analysed, evaluated and recommendations are communicated to appropriate personnel

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired managing critical incidents.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO523A Critical incident

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant environmental, occupational health and safety legislation and regulations
- Enterprise procedures
- Plant drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Relevant plant and equipment, its location and operating parameters
- Plant status
- Enterprise recording procedures
- System/network characteristics
- Contingency plans
- Supervisory, alarm, protection and control equipment
- Load shedding principles
- Control and data acquisition systems
- Switching practices and procedures

T2 Specific skills needed to achieve the Performance Criteria:

- Interpret plant drawings and manufacturers manuals
- Apply enterprise recording procedures
- Manager and control system/network
- Identify plant status
- Communicate effectively
- Apply data analysis techniques and tools
- Identify and respond to abnormal system operating conditions
- Plan and prioritise work
- Coordinate the operation of system/network to maintain plant integrity,

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REQUIRED SKILLS AND KNOWLEDGE

personnel safety, continuity of supply and optimum efficiency

- Apply stress management techniques
- Direct and coordinate personnel
- Select appropriate load shedding
- Apply diagnostic techniques.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical

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equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all prerequisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - employability skillsConduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedure
- Demonstrated performance across a representative range of

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contexts from the prescribed items below:

- The knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
- Knowledge of emergency procedures
- Knowledge of the rolls of external authorities/bodies
- Ability to establish and manage emergency situations
- Ability to tactical decision making techniques
- Policies for system incident and follow up procedures
- Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment **9.3)**

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working in limited spaces with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00

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Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole, providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Safety standards may include relevant sections of Occupational Health and Safety legislation, enterprise safety rules, relevant State and federal legislation, national standards for plant.

Information and documentation sources may include verbal or written communications; enterprise safety rules documentation; enterprise operating instructions; dedicated computer equipment; enterprise/site standing and operating instructions; enterprise log books; manufacturer’s operation and maintenance manuals; and equipment and alarm manuals.

Technical and operational indicators may include stimuli (audio, smell, touch, visual), local indicators and recorders, computers and alarms (visible and or audible).

Communications may be by means of telephone, two way radio, pager, computer (electronic mail) and operating logs (written or verbal).

Appropriate personnel, team members/other authorities may include supervisor/team

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RANGE STATEMENT

leader or equivalent, power plant operations personnel or equivalent, technical and engineering officers or equivalent, maintenance staff, other operating staff or equivalent, system controller, field operators, restricted operators, emergency personnel, network controllers/coordinators, generation controllers, plant operators, field operators, support staff, fire service, police, ambulance, emergency services, enterprise and site representatives, consumers and independent power producers.

Operating environment may be: remote from plant and equipment being operated (operation is assisted by remote indicators of plant status and other parameters monitored), during inclement or otherwise harsh weather conditions, in wet/noisy/dusty areas or during night periods.

Unit operations may include spurious faults in automatic systems, automatic systems operating out of range, failure of automatic system components and routine plant movement.

Types of incident may include localised blackout, interconnected/isolated power system potential power system threat, accidents, life threatening situations, generation plant and auxiliary plant faults/failure and loss of network and generation components, natural and environmental disasters.

System conditions may be: voltage profiles, spare plant, generation/transmission capability limits, variation from normal trends and switching.

Documentation may include policy, procedure, standard operating instructions, contingency plans and emergency switching programs.

Liaison with key stakeholders may be system/network controllers/coordinators, oncoming shift change, field operators, support staff, asset centres, patrolmen, customers, other government bodies, co-generation authorities, generation plant operators, on call staff, police, fire and emergency services and private systems.

Post incident debrief may be: probable fault/failure cause, strategic/contingency plan, environmental implications, economic factors, policy, procedure, training, safety factors and emergency switching programs.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

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Competency Field

Competency Field **11)**

Operations

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UEPOPS524A Evaluate the scheduling of generation

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to un1dertake the evaluation of a generation plant schedule to economically meet forecast demand.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like

Pre-Requisites

Prerequisite Unit(s) **4)**

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Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
UEPOPS422B	Schedule generation

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading	5	Writing	5	Numeracy	5

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a

Performance Criteria describe the required performance needed to demonstrate achievement of the element.

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competency standard unit	Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Analyse load profile	1.1	Comprehensive information on all variables which have the potential to affect demand is analysed to enable a realistic forecast
	1.2	Forecast prediction is based on the analysis of relevant information
	1.3	Forecast prediction is evaluated against real time trends and adjustments made where applicable
	1.6	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2 Evaluate unit availability and capability	2.1	Unit status information is analysed to maintain the integrity of scheduling plans
	2.2	Information is processed and recorded in a time frame that enables effective identification of problems
	2.3	Comprehensive information on all factors which have the potential to affect the unit status is evaluated
	2.5	Effective relationships are cultivated and maintained with remote/independent power generators
3 Evaluate generation unit schedules	3.1	Base load generation schedule is analysed with contractual obligations and enterprise procedures
	3.2	Peak load generation schedule is analysed to meet system demand and maintain adequate spinning reserve capability
	3.3	The schedule is evaluated to confirm units are operated in economic merit within the

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ELEMENT	PERFORMANCE CRITERIA	
		framework of the enterprise fuel strategies
	3.4	Megawatts and megavar spinning reserve criteria are evaluated at all times in accordance with local instructions
	3.5	System security criteria are analysed at all times in accordance with enterprise procedures
	3.6	Quality of supply standards are analysed at all times in accordance with statutory requirements
	3.7	Plant maintenance commitments are analysed in setting priorities for committing units
	3.8	Schedule is produced with sufficient lead time to allow effective plant movements to occur
	3.9	Power station plant problems are accurately assessed in terms of impact on unit commitment and scheduling requirements
	3.10	Plant testing commitments are incorporated in setting priorities for committing units
4 Complete documentation	4.1	Scheduling information is recorded and communicated to all stakeholders in accordance with system procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired evaluating generation schedules.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO524A The scheduling of generation

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant environmental, occupational health and safety legislation and

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REQUIRED SKILLS AND KNOWLEDGE

regulations

- Enterprise procedures
- Plant drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Relevant plant and equipment, its location and operating parameters
- Relevant state and territory regulations
- Plant design parameters
- Plant status
- Planning techniques
- Risk management techniques
- Power plant operating parameters
- Enterprise recording procedures
- Systems operating instructions
- Relationships that weather, social and industrial variables have on system demand
- Economic operating criteria including fuel strategies
- Computers and software

T2 Specific skills needed to achieve the Performance Criteria:

- Interpret plant drawings and manufacturers manuals
- Apply relevant state and territory regulations
- Apply relevant statutory legislation
- Apply relevant enterprise/site safety procedures
- Apply enterprise/site emergency procedures and techniques
- Apply enterprise recording procedures
- Schedule plant within design parameters to meet demand
- Identify plant status
- Communicate effectively
- Apply data analysis techniques and tools
- Plan and prioritise work
- Evaluate the scheduling of generating units to maintain optimum system efficiency
- Operate screen based equipment.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall

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EVIDENCE GUIDE

be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be ‘rich’ in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its ‘richness’. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate **9.2)**

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competency in this unit

Before the critical aspects of evidence are considered all prerequisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - employability skillsConduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedure
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Forecasting load profiles
  - Identifying unit status
  - Preparing generation schedules
  - Implementing generation schedules
  - Operating and loading characteristics of generation plant
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

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Context of and specific resources for assessment **9.3)**

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working in limited spaces with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

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There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole, providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Stations/generation plant may include main power station, remotely controlled power station, independent power producers, single and multiple generating sets and interconnected/isolated power systems.

Safety standards may include relevant sections of Occupational Health and Safety legislation, relevant State and federal legislation, national standards for plant and enterprise safety rules.

Information and documentation sources may include verbal or written communications; enterprise safety rules documentation; enterprise operating instructions; dedicated computer equipment; enterprise/site standing and operating instructions; enterprise log books; manufacturer's operation and maintenance manuals; and equipment and alarm manuals.

Technical and operational indicators may include local indicators and recorders and computers.

Communications may be by means of telephone, two way radio, pager, computers (electronic mail) and operating logs (written or verbal).

Appropriate personnel for consultation, give or receive direction may include supervisor/team leader or equivalent, power plant operations personnel or equivalent, technical and engineering officers or equivalent, maintenance staff, other operating staff or equivalent, system controller/network controller, field operator, independent generators and fuel suppliers.

Strategies and resources may include fuel, quality of supply, contract and commitments.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

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Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations

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UEPOPS525A Coordinate and direct switching program

Modification History

Release	Action	Core/Elective	Details	Points
2	Edit		Remove UEPOPS429B from pre-requisites as no unit with this code exists	

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to coordinate and direct resources for a switching program.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
UEPOPS456A	Perform switching to a switching program

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 5 Writing 5 Numeracy 5

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

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Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT		PERFORMANCE CRITERIA	
1	Prepare for switching program	1.1	Qualifications/authorisations of personnel performing switching operations are established
		1.2	Occupational health & safety standards, statutory/enterprise regulations, codes of practice and environmental requirements are identified, applied and monitored throughout the program
		1.3	Contingency plans are evaluated and discussed with appropriate stakeholders and, where necessary, amendments are relayed to all relevant parties
		1.4	Permits and access requirements are established prior to program commencement
		1.5	Documentation is distributed to relevant parties prior to program commencement
		1.6	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2	Direct switching program	2.1	All parties involved in switching program are advised and directed to locations
		2.2	Communication is established with all involved parties and maintained throughout duration of program
		2.3	System schematic diagram or equivalent is updated as program proceeds
		2.4	Access to plant is controlled in accordance with

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ELEMENT	PERFORMANCE CRITERIA	
		enterprise/site policy
	2.5	Work groups are coordinated and directed in accordance with enterprise procedures
	2.6	Permits issued are monitored and recorded in accordance with enterprise procedures
	2.7	Switching program is controlled to ensure outage coincides with planned timetable
3 Maintain dynamic integrity of system	3.1	Switching program steps are verified before and after each operation
	3.2	Steps are logged upon successful completion of each operation
	3.3	System conditions/stability is constantly monitored in accordance with system requirements
	3.4	Alternative program steps are quickly and accurately developed if/when unexpected problems occur
4 Complete documentation	4.1	Documentation is updated and equipment problems, abnormalities and status are reported and logged in accordance with enterprise/site procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired co-ordinating and directing switching programs.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO525A Switching program

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant environmental, occupational health and safety legislation and

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REQUIRED SKILLS AND KNOWLEDGE

regulations

- Enterprise procedures
- Plant drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Relevant plant and equipment, its location and operating parameters
- Relevant state and territory regulations
- Switchgear types and characteristics
- Electrical protection types and characteristics
- Electrical principles
- a.c. generators types and characteristics
- Transformers types and characteristics
- Risk management
- Leadership techniques
- Plant status
- Enterprise recording procedures
- Switching operations and procedures
- System diagrams
- Systems (network)
- Computers and software

T2 Specific skills needed to achieve the Performance Criteria:

- Interpret plant drawings and manufacturers manuals
- Apply relevant state and territory regulations
- Apply enterprise recording procedures
- Identify plant status
- Communicate effectively
- Acquire and analyse information relevant to system operation
- Recognise abnormal plant/system operating conditions
- Determine appropriate corrective actions required
- Plan and prioritise work
- Acquire and analyse information relevant to system operation
- Recognise abnormal plant/system operating conditions
- Apply leadership techniques
- Determine appropriate corrective actions required.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and

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EVIDENCE GUIDE

must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be ‘rich’ in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its ‘richness’. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

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Critical aspects of evidence required to demonstrate competency in this unit **9.2)**

Before the critical aspects of evidence are considered all prerequisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit
  - employability skillsConduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedure
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Preparing for switching programs
  - Directing and coordinating switching programs
  - Monitoring system integrity and stability
  - Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

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Context of and specific resources for assessment **9.3)**

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working in limited spaces with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

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There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole, providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Safety standards may include relevant sections of Occupational Health and Safety legislation, enterprise safety rules, relevant State and federal legislation and national standards for plant.

Information and documentation sources may include verbal or written communications; enterprise safety rules documentation; enterprise operating instructions; dedicated computer equipment; enterprise/site standing and operating instructions; enterprise log books; manufacturer's operation and maintenance manuals; and equipment and alarm manuals.

Technical and operational indicators may include stimuli (audio, smell, touch, visual), local indicators and recorders, computers and alarms (visible and or audible).

Communications may be by means of telephone, two way radio, pager, computer (electronic mail), operating logs (written or verbal), faxes and reports.

Appropriate personnel for consultation, to give or receive direction may include supervisor/team leader or equivalent, power plant operations personnel or equivalent, technical and engineering officers or equivalent, maintenance staff, other operating staff or equivalent, high voltage operators, restricted high voltage operators, testers in charge, testers, recipient in charge, recipients, contractors and system/network operators.

Work parties may include enterprise personnel and contractors.

Operating environment may be remote from plant and equipment being operated (operation is assisted by remote indicators of plant status and other parameters monitored), during inclement or otherwise harsh weather conditions, in wet/ noisy/dusty areas or during night periods.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries

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Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations

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UEPOPS526A Coordinate electrical energy production

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to coordinate the safe and effective management of energy production to meet demand on an electricity generating unit.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
UEPOPS457A	Control electrical energy production

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 5 Writing 5 Numeracy 5

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

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Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT		PERFORMANCE CRITERIA	
1	Coordinate unit operations	1.1	Systems are operated to meet requirements whilst observing plant limitations
		1.2	Systems are monitored and observed to detect deviations from normal operating conditions
		1.3	Causes of abnormal operating conditions are identified by analysing the technical and operational information
		1.4	Corrective actions taken to rectify system abnormalities are in accordance with enterprise and site requirements
		1.5	System integrity, personnel safety and continuity of supply are maintained throughout
		1.6.	Consultation with appropriate personnel is undertaken as required in accordance with site requirements
		1.7	Systems are operated at optimum efficiency.
		1.8	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2	Monitor system/plant	2.1	System/plant to be monitored is physically identified
		2.2	System/plant is monitored for normal operation or to detect deviations
		2.3	Corrective action taken is in accordance with

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ELEMENT		PERFORMANCE CRITERIA	
			enterprise/site procedures
		2.4	Appropriate personnel are notified when defects and abnormal operating conditions are detected
3	Test system/plant operation	3.1	Tests are performed in accordance with defined procedures applicable to the operational test
		3.2	System/plant is observed for correct operational response
		3.3	Correct action is taken when response is not in accordance with documentation, plant/system integrity or personnel safety requirements
		3.4	System/plant is returned to required operational status upon completion of test
4	Analyse system/plant faults	4.1	Causes of abnormal system operating conditions are identified by analysing the technical and operational information in a logical and sequential manner
		4.2	Actions necessary to rectify fault are correctly determined
		4.3	System/plant integrity and personnel safety are maintained through consultation with appropriate personnel, and reference to plant, technical and operational documentation
		4.4	Appropriate personnel are arranged for local investigation of identified operational abnormalities
5	Complete documentation	5.1	Documentation is updated and plant problems, movements, abnormalities and status are reported and logged in accordance with enterprise/site procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this

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REQUIRED SKILLS AND KNOWLEDGE

unit.

Evidence shall show that knowledge has been acquired co-ordinating electrical energy production.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO526A Electrical energy production

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant environmental, occupational health and safety legislation and regulations
- Enterprise procedures
- Plant drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Relevant plant and equipment, its location and operating parameters
- Relevant state and territory regulations
- Electric motor types and characteristics
- Switchgear types and characteristics
- Electrical protection types and characteristics
- Electrical principles
- Process control principles
- Plant process control systems
- a.c. generators types and characteristics
- Transformers types and characteristics
- Generator excitation and cooling systems, types and characteristics types and characteristics
- Enterprise recording procedures
- Control and data acquisition systems
- Supervisory, alarm, protection and control equipment
- Principles of generator and system stability
- The systems components and interactions
- Auxiliary supply systems
- High voltage systems

T2 Specific skills needed to achieve the Performance Criteria:

- Interpret plant drawings and manufacturers manuals
- Apply relevant state and territory regulations
- Apply enterprise recording procedures
- Identify plant status
- Prepare plant/equipment for operation
- Organise resources
- Coordinate power generation

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REQUIRED SKILLS AND KNOWLEDGE

- Apply diagnostic and testing techniques
- Identify and respond to abnormal plant operating conditions
- Plan and prioritise work
- Use relevant hand tools
- Communicate effectively
- Apply data analysis techniques and tools
- Coordinate the operation of interacting systems
- Coordinate the operation of plant and equipment
- Maintain generator unit integrity
- Apply principles of electrical generation.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place,

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access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all prerequisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) Essential Knowledge and Associated Skills of this unit

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- employability skillsConduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedure

- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The preparation and planning of work
  - The operation of generator and excitation systems
  - Coordination of unit operations
  - Analysing plant faults
  - Monitoring plant operation
  - Controlling system energy generation
  - The knowledge of generator and system stability principles

Context of and specific resources for assessment **9.3)**

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working in limited spaces with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

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Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole, providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Systems, plant and equipment may include generator cooling systems; fuel delivery systems; generator and generator auxiliary plant; generator seal oil system; generation fire protection system; boiler, turbine and unit coordinated control systems; generator circuit breaker/transformer; unit auxiliary switchboards; electricity market auto loading systems; generator excitation systems which may include- d.c. pilot excitors and amplidyne(s) control, a.c. pilot excitors and thyristor control, brushless systems, static systems, associated supervisory, control and protection equipment; Circuit breakers, field, excitor, flashing, associated supervisory, control and protection equipment; Transformers, excitation, earthing and neutral, voltage and current; and automatic voltage regulator (AVR) system.

Safety standards may include relevant sections of Occupational Health and Safety legislation, enterprise safety rules, national standards for plant, relevant State and federal legislation and Australian standards.

Information and documentation sources may include verbal or written communications; enterprise safety rules documentation; enterprise operating

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RANGE STATEMENT

instructions; equipment and alarm manuals; dedicated computer equipment; enterprise standing instructions and plant notes; enterprise log books; market load profile forecasts; electricity market bidding information; and manufacturer's operation and maintenance manuals.

Technical and operational indicators may include stimuli (audio, smell, touch, visual), remote or local indicators and recorders, computers and alarms (visible and/or audible).

Communications may be by means of telephone, two way radio, pager, computer (electronic mail) and operating logs (written or verbal).

Tests may include supply change-over tests, "black" start tests and capability tests.

Appropriate personnel to consult, give or receive direction may include supervisor/team leader or equivalent; other coordinators of energy production; other operating staff; technical and engineering officers or equivalent; maintenance personnel; and contractor staff.

Operating environment may be remote from plant and equipment being operated; where operation is assisted by remote indicators of plant status and other parameters monitored; during night periods; during inclement or otherwise harsh weather conditions; and in wet/noisy/dusty areas.

Unit operations (systems requirements) may include normal generating models and system auto frequency control mode.

Faults and abnormal operating conditions may include unit trip; market distribution network disturbances; loss of station a.c. supplies; spurious abnormal fuel condition, operations; generator hydrogen cooling/sealing system malfunctions; generator cooling system malfunctions; generator excitation/transformer; CB faults/malfunctions; and unit coordinated controls malfunctions.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations

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UEPOPS527A Manage first response team

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to manage the operation of a response team. It covers the development, implementation and review of the procedures for the operation of the first response team.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies.

The operation of the first response team is to support other emergency service groups and the procedures are to comply with State and/or Local Government laws and regulations for the management of emergency incidents.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title
UEPOPS404B	Coordinate First Response Team Operation
UEPOPS210B	Conduct First Response within a Workplace Team

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 5 Writing 5 Numeracy 5

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

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Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT		PERFORMANCE CRITERIA	
1	Plan for the operation of the first response team	1.1	The purpose of the response team is identified and, where necessary, clarified with relevant people or organisations
		1.2	The roles and responsibilities of emergency service(s) personnel are clarified, and where necessary conveyed to others.
		1.3	Team members are identified and supported in relation to duties and responsibilities
		1.4	Directions and advice are given to emergency service personnel and team members after appropriate site inspection
2	Manage the operation of the first response team	2.1	Incidents are investigated, assessed and evaluated to prevent repetition of risk
		2.2	Results and recommendations relating to incident investigations are documented and confirmed with the appropriate personnel and in accordance with enterprise procedures
		2.3	Guidance and assistance for emergency services is provided in accordance with enterprise/site procedures
		2.4	Materials, equipment and resources required to satisfy the job are identified obtained and assessed
		2.5	De-briefing is conducted and findings are responded to in accordance with procedures
3	Report outcomes of	3.1	Improvements to incident response procedures are identified and confirmed with the appropriate

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ELEMENT	PERFORMANCE CRITERIA	
emergency response		personnel.
	3.2	Results of debriefing are reported in accordance with procedures
	3.3	Improvements to incident response procedures are implemented.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the Essential Skills and Knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired managing first response team operations.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO527A First response team

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant environmental, occupational health and safety legislation and regulations
- Enterprise procedures
- Plant drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Relevant plant and equipment, its location and operating parameters
- Relevant state and territory first response regulations
- Interpersonal skills techniques
- Performance management techniques
- Stakeholder management techniques
- Time management techniques
- Leadership techniques
- Meeting leadership techniques
- Enterprise/site emergency procedures and techniques
- Plant status
- Site communications systems
- First aid

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REQUIRED SKILLS AND KNOWLEDGE

- Appropriate warning signs
- Equipment appropriate for the task
- Operation and maintenance of emergency response equipment
- Operation of emergency stations
- Roles of the first response team and its members
- Classifications of fires and emergencies
- Roles and responsibilities of emergency services
- Fire fighting and rescue principles and techniques
- Communication principles
- Material safety data sheets and emergency services

T2 Specific skills needed to achieve the performance criteria:

- Interpret plant drawings and manufacturers manuals
- Apply relevant state and territory regulations
- Apply enterprise/site emergency procedures and techniques
- Locate relevant plant and equipment
- Prepare emergency plant/equipment for operation
- Communicate effectively
- Plan and prioritise work
- Identify and operate appropriate emergency communications equipment

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the range statement of the competency standard unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment	**9.1)**
	Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for

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apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this

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shall incorporate evidence that shows a candidate is able to:

- Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
- Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
- Demonstrate an understanding of the essential knowledge and associated skills as described in 6) of this unit
- Demonstrate an appropriate level of employability skills
- Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures

- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Ability to apply leadership skills
  - Ability to communicate effectively with the appropriate personnel and agencies following an emergency
  - Knowledge of potential hazards
  - Knowledge and application of fire-fighting and rescue principles and techniques
  - Ability to manage the Teams response to an emergency situation
  - Dealing with an unplanned event by drawing on Essential Knowledge and Skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this competency standard unit.

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Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.Note: Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified Essential Knowledge and Associated Skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the Essential Knowledge and Skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed

Nil	Assessment of this unit should also confirm that other competencies required to underpin this unit are satisfied

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Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Incidents may include fire, rescue, hazardous substances, explosions, bomb alerts, terrorists, radiation, natural disasters, environmental, electrical storms/incidents, accidents, electrical equipment, structural, security related or wildlife related incidents.

Special assistance may be on site personnel (e.g. chemists, fire team), rescue team, environmental officer, safety officer, radiation officer floor warden or equivalent, chief warden or equivalent and security staff.

External emergency groups may include police, fire brigade, ambulance, State emergency service supply authorities (such as water utility).

Communications may be by means of verbal, telephone system, two-way radio, pager, emergency public address system, radio, facsimile, computer (electronic mail), enterprise/site log book, whistle or hand signal.

Additional resources may include personnel, fire fighting equipment, fire fighting protective clothing, chemical protective clothing, air cylinders for breathing apparatus, rescue equipment, fire retardant compounds, oil containment materials/equipment, vehicles for transport of materials or personnel, stand-by air compressors, storm water pumps, gas monitoring equipment, communication equipment, ladders, spill kits, salvage gear and forcible entry tools.

Site hazards may include power lines, trees, overhead service lines, abnormal weather conditions, dangerous materials/chemicals, earthworks/obstructions, underground services, hazardous substances and electrical, thermal, explosive and structural hazards.

Technical advice may include plant layout, plant location, isolation points, location and quantity of hazardous substances and location of fire hydrants, pumps and water supplies.

Information and documentation sources may include verbal and written communications, enterprise/site operating instructions, equipment manufacturer’s recommendations, dedicated computer equipment and enterprise/site log books.

Personnel refers to all people on site at the time of the emergency and may include supervisory, maintenance and operational staff, contractors, trainees and visitors.

Operating environment may be during inclement or otherwise harsh weather conditions, in wet/noisy/dusty/hot areas or during night periods.

Technical and operational indicators may include stimuli (audio, smell, touch, visual), computers and alarms (visible and or audible).

Safety standards may include relevant sections of Occupational Health and Safety legislation, enterprise safety rules, national standards for plant and relevant state and

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RANGE STATEMENT

federal legislation.

Identification may include helmets, armbands, vests and other apparel.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations.

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UEPOPS528A Manage environmental management systems

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to manage the environmental management strategy of the organisation. It involves the implementation of the policy and procedures covering environmental legislation and regulations

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety.

Pre-Requisites

Prerequisite Unit(s) **4)**

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Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

Unit Code	Unit Title

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 5 Writing 5 Numeracy 5

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a	Performance Criteria describe the required performance needed to demonstrate achievement of the element.

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competency standard unit	Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan for management of the environmental management strategies	1.1 The purpose of the strategy is identified and, where necessary, clarified with relevant people and organisations
	1.2 Potential activities/operations that may impact on the environment are identified and investigated to ensure that minimisation strategies can be developed
	1.3 Management strategies are developed, selected and prioritised for implementation in order to provide the most effective resolution of issues/problems
	1.4 Achievable timelines, schedules and targets are established which enable strategy objectives to be met
	1.5 Financial resources, personnel, and physical facilities and equipment are determined and procured to achieve the strategy outcomes
2 Manage environmental management stratégies	2.1 Environmental strategies/requirements are documented, assessed and evaluated to prevent repetition of risk
	2.2 Results and recommendations relating to environmental requirements are documented and confirmed with the appropriate personnel and in accordance with enterprise plan and procedures
	2.3 Others involved in, or affected by, the strategy are consulted in order to facilitate acceptance of the strategy implementation process
	2.4 Environmental strategy/requirements are promoted with the knowledge and cooperation of others involved in, or affected by, the implementation

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ELEMENT	PERFORMANCE CRITERIA	
3 Monitor environmental management strategies	3.1	Regular data is collected to provide accurate measures of performance
	3.2	Statistically valid comparisons are made between objectives and performance to establish if objectives have been met
	3.3	Feedback from other personnel is evaluated in order to determine if changes to strategies are required
	3.4	Changes to implemented strategy are recommended as required by the enterprise plan or procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired developing implementing and monitoring environmental management systems.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO528A Environmental management systems

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant environmental, occupational health and safety legislation and regulations
- Enterprise procedures
- Plant drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Relevant plant and equipment, its location and operating parameters
- Interpersonal skills techniques
- Stakeholder management techniques
- Time management techniques
- Leadership techniques
- Liaising with contractors and clients

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REQUIRED SKILLS AND KNOWLEDGE

- Project management techniques
- Project planning techniques
- Leadership techniques
- Relevant environmental statutory requirements (acts, legislation, regulations) and codes of practice
- Environmental awareness and impact
- Environmental planning/management
- Sources of pollution
- Pollution minimisation
- Resource usage
- Engineering practices
- Communication principles
- Strategic planning
- Risk management techniques
- Enterprise environmental strategies
- Responding to environmental issues

T2 Specific skills needed to achieve the performance criteria:

- Interpret plant drawings and manufacturers manuals
- Apply relevant statutory requirements and codes of practice
- Recognise potential environmental issues
- Carry out environmental planning/strategy development
- Carry out risk management
- Research environmental reports
- Develop environmental strategies
- Identify sources of pollution
- Apply pollution minimisation procedures
- Manage resources
- Monitor environmental procedures/requirements
- Recommend strategy change
- Communicate effectively
- Apply data analysis techniques and tools.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the range statement of the competency standard unit and the Training Package Assessment Guidelines.

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EVIDENCE GUIDE

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

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Critical aspects of evidence required to demonstrate competency in this unit **9.2)**

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Producing environmental management strategies
  - Implementing environmental management strategies
  - Monitoring and reviewing environmental strategies
  - Dealing with an unplanned event by drawing on Essential Knowledge and Skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

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Context of and specific resources for assessment **9.3)**

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this competency standard unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified Essential Knowledge and Associated Skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the Essential Knowledge and Skills described in this unit.

Concurrent assessment and relationship with **9.5)**

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other units

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Resources may include national, state, local or enterprise; environmental legislation, regulations, rules, codes of practice or procedures, case studies and technical reports.

Potential activities/operations may include pollution threats to air and water, noise levels, hazardous sites and chemicals.

Existing strategies may refer to national, industry or enterprise strategies or external recommendations.

Personnel may refer to on-site staff, consultants, statutory/government agencies, community and technical experts.

Implementation may affect on site personnel including contract personnel and the community.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations.

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UEPOPS529A Manage operational strategies for power production

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the skills and knowledge required to manage operational strategies to achieve the short and long term goals of the production plant.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

There are no pre-requisite units.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 5 Writing 5 Numeracy 5

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the

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Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Identify long and short term strategies	1.1 The purpose of the strategy is identified and where necessary, clarified with relevant people or organisations
	1.2 Relevant budgets, operational/maintenance and personnel requirements are considered
	1.3 Relevant information is analysed and evaluated in accordance with enterprise procedures
	1.4 Information and data is coordinated and formatted as required to meet the needs of the enterprise
	1.5 Operating strategy is monitored for suitability/approval in accordance with statutory, industry and enterprise/site requirements
	1.6 Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training.
2 Implement/monitor strategy	2.1 Plant operational procedures are adhered to in consultation with others and reviewed as required
	2.2 Plant operation and/or condition is monitored and reported against statutory and enterprise requirements taking into account constraints and budget requirements
	2.3 Abnormal operating conditions are investigated and reported
	2.4 Critical resources and supplies are monitored
	2.5 Human resource requirements are coordinated and monitored
	2.6 De-briefing in conducted and findings are

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ELEMENT	PERFORMANCE CRITERIA	
		responded to in accordance with procedures
3 Report outcomes power production	3.1	Improvements to strategies are identified and confirmed with the appropriate personnel
	3.2	Results of de-briefing are reported in accordance with procedures
	3.3	Improvements to strategies are implemented

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired establishing and implementing operational strategies for power production.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PO529A Operational strategies for power production

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant environmental, occupational health and safety legislation and regulations
- Enterprise procedures
- Plant drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Relevant plant and equipment, its location and operating parameters
- Relevant state and territory regulations
- Operational strategies principles
- Interpersonal skills techniques
- Stakeholder management techniques
- Time management techniques
- Leadership techniques
- Liaising with contractors and clients
- Data collection and analysing techniques
- Plant status

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REQUIRED SKILLS AND KNOWLEDGE

- Enterprise recording procedures
- Measurement and analysis systems and procedures
- Risk management principles

T2 Specific skills needed to achieve the performance criteria:

- Interpret plant drawings and manufacturers manuals
- Apply relevant state and territory regulations
- Apply relevant statutory legislation
- Apply enterprise/site emergency procedures and techniques
- Apply enterprise recording procedures
- Identify plant status
- Apply problem solving
- Plan and prioritise work
- Communicate effectively
- Apply stakeholder management techniques
- Apply time management techniques
- Apply leadership techniques
- Apply risk management principles
- Apply data analysis techniques and tools.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the range statement of the competency standard unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment

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is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UEP12". Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:

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- Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
- Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
- Demonstrate an understanding of the essential knowledge and associated skills as described in 6) of this unit
- Demonstrate an appropriate level of employability skills
- Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures

- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Plant operating parameters
  - Generation plant and systems
  - Establishing and implementing operational strategies
  - Dealing with an unplanned event by drawing on Essential Knowledge and Skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this competency standard unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

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In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

Method of assessment

9.4)

This unit shall be assessed by methods given in Section 1.3.00 Assessment Guidelines.

Note: Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the Essential Knowledge and Skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed

Nil

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Strategies include both long and short term.

Budget includes resources supplies and energy production.

Reference information includes operational data, maintenance data, market

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RANGE STATEMENT

requirements and statutory requirements.

Communication includes liaison with customers.

Produced documents include plant reliability and efficiency reports.

Resources include fuel, consumables, materials, plant and human resources.

Reference documentation includes operating, maintenance procedures, manuals, drawings, original equipment manufacturer data, statutory requirements and standards.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Operations.

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BSBFLM303C Contribute to effective workplace relationships

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit describes the performance outcomes, skills and knowledge required to gather information and maintain effective working relationships and networks, with particular regard to communication and representation. No licensing, legislative, regulatory or certification requirements apply to this unit at the time of endorsement.

Application of the Unit

Application of the unit	Frontline managers have a key role in contributing to efficient and effective work teams within the context of the organisation. They play a prominent part in motivating, mentoring, coaching and developing team cohesion through providing leadership for the team and forming the bridge between the management of the organisation and the team members. At this level, work will normally be carried out within known routines, methods and procedures which require the exercise of some discretion and judgement. This unit is related to BSBWOR401A Establish effective workplace relationships.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units	

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Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Seek, receive and communicate information and ideas	1.1. Collect ***information*** associated with the achievement of work responsibilities from appropriate ***sources*** 1.2. Communicate ideas and information to ***diverse audiences*** in an appropriate and sensitive manner 1.3. Seek contributions from internal and external sources to develop and refine new ideas and approaches in accordance with organisational processes 1.4. Facilitate ***consultation processes*** to allow employees to contribute to issues related to their work, and promptly communicate outcomes of consultation to the work team 1.5. Promptly deal with and resolve issues raised, or refer them to ***relevant personnel***
2. Encourage trust and	2.1. Treat people with integrity, respect and empathy

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ELEMENT	PERFORMANCE CRITERIA
confidence	2.2. Encourage effective relationships within the framework of ***the organisation's social***, ***ethical and business standards*** 2.3. Gain and maintain the trust and confidence of ***colleagues***, ***customers and suppliers*** through competent performance 2.4. Adjust interpersonal styles and methods in relation the to organisation's social and cultural environment
3. Identify and use networks and relationships	3.1. Identify and utilise ***workplace networks*** to help build relationships 3.2. Identify and describe the value and benefits of networks and other work relationships for the team and the organisation
4. Contribute to positive outcomes	4.1. Identify difficulties and take action to rectify the situation within own level of responsibility according to organisational and legal requirements 4.2. Support colleagues in resolving work difficulties 4.3. Regularly review ***workplace outcomes*** and implement improvements in consultation with relevant personnel 4.4. Identify and resolve ***poor work performance*** within own level of responsibility and according to organisational policies 4.5. Deal constructively with conflict, within the organisation's established processes

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

- ability to relate to people from a range of social, cultural and ethnic backgrounds and physical and mental abilities
- coaching and mentoring skills to provide support to colleagues
- functional literacy skills to access and use workplace information
- relationship management and communication skills to:
  - interpret information from a variety of people
  - respond to unexpected demands from a range of people

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REQUIRED SKILLS AND KNOWLEDGE
• gain the trust and confidence of colleagues • deal with people openly and fairly • forge effective relationships with internal and/or external people.
Required knowledge

• principles and techniques associated with relationship management, including:
  • developing trust and confidence
  • behaving consistently in work relationships
  • identifying the cultural and social environment
  • identifying and assessing interpersonal styles
  • establishing networks
  • identifying and resolving problems
  • handling conflict
  • managing poor work performance
  • monitoring and improving work relationships
  • using anti-discrimination/bias strategies and making contributions
• relevant legislation from all levels of government that may affect business operation, especially in regard to:
  • occupational health and safety and environmental issues
  • equal opportunity
  • industrial relations
  • anti-discrimination.

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Evidence of the following is essential: • using culturally appropriate communication techniques to share work-based information with teams and individuals in accordance with organisation policies • developing networks and building team relationships

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EVIDENCE GUIDE	
	• regularly reviewing workplace outcomes to identify and resolve issues and implement improvements within own level of responsibility and according to organisational policies.
Context of and specific resources for assessment	Assessment must ensure: • access to appropriate documentation and resources normally used in the workplace.
Method of assessment	A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate for this unit: • direct questioning combined with review of portfolios of evidence and third party workplace reports of on-the-job performance by the candidate • oral or written questioning to assess knowledge and understanding of principles of relationship management and organisation's social, ethical and business standards • presentation of examples of actions taken by the candidate to build networks and contribute to positive workplace relationships and outcomes.
Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended, for example: • other management or frontline managementunits.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Information may include:	• archived, filed and historical background data • electronic or manual transmission • individual and team performance data • marketing and customer-related data

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RANGE STATEMENT	
	• organisation policies and procedures • planning and organisational documents including the outcomes of continuous improvement and quality assurance • written or verbal communications

Sources of information may be:	• external, such as:
	  • external customers
	  • web based resources
	  • reports
	• internal, such as:
	  • supervisors, managers and peers
	  • organisation policies and procedures
	  • workplace documents

Diverse audiences may include:	• persons with specific social, cultural and other needs that require a range of strategies and approaches including adjusting communication
Consultation processes may include:	• feedback to the work team and relevant personnel in relation to outcomes of the consultation process • opportunity for employees to contribute ideas and information
Relevant personnel may include:	• OHS committees and OHS representatives • people with specialist responsibilities • supervisors, managers and other employees • union representatives/groups

The organisation's social, ***ethical and business standards*** may refer to:	• implied standards such as honesty and respect relative to the organisation culture and generally accepted within the wider community
	• rewards and recognition for high performing staff
	• standards expressed in legislation and regulations such as anti-discrimination legislation
	• written standards such as those expressed in:
	  • vision and mission statements
	  • policies
	  • code of workplace conduct/behaviour
	  • dress code
	  • statement of workplace values

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RANGE STATEMENT	
Colleagues, customers and suppliers may include:	• employees at the same level and more senior managers • internal and external contacts • people from a wide variety of social, cultural and ethnic backgrounds • team members
Workplace networks may be:	• formal or informal • individuals or groups • internal or external • structured or unstructured
Workplace outcomes may include:	• OHS processes and procedures • performance of the work team
Poor work performance may relate to:	• self or work team; or it may extend to the organisation as a whole

Unit Sector(s)

Unit sector	

Competency field

Competency field	Management and Leadership - Frontline Management

Co-requisite units

Co-requisite units		

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BSBFLM305C Support operational plan

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit describes the performance outcomes, skills and knowledge required to provide support for operational practices and procedures within the organisation's productivity and profitability plans. This includes contributing to the operational plan, assisting in recruiting employees and acquiring resources, and monitoring and adjusting operational performance. No licensing, legislative, regulatory or certification requirements apply to this unit at the time of endorsement.

Application of the Unit

Application of the unit	Frontline managers are actively engaged in planning activities to achieve the measurable, stated objectives of the team and the organisation. This key role is carried out to provide safe, efficient and effective products and services to customer satisfaction within the organisation's productivity and profitability plans. At this level, work will normally be carried out within known routines, methods and procedures, and may also involve a number of complex or non routine activities that require some discretion and judgement. This unit is related to BSBMGT402A Implement operational plan.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Contribute to implementation of operational plan	1.1. Collect and record details of ***resource requirements*** and report to ***relevant personnel*** 1.2. Ensure the ***operational plan*** contributes to the achievement of the organisation's performance and business plan 1.3. Identify ***key performance indicators*** to measure own and work team's performance 1.4. Undertake ***contingency planning*** as required 1.5. Support the development and presentation of proposals for resource requirements as required
2. Assist in recruiting employees and acquiring resources	2.1. Assist with employee recruitment and/or induction as required, within ***the organisation's policies***, ***practices and procedures*** 2.2. Acquire physical resources and services according

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ELEMENT	PERFORMANCE CRITERIA
	to the organisation's policies, practices and procedures and in consultation with relevant personnel
3. Support operations	3.1. Identify and utilise ***performance systems and processes*** to assess team progress in achieving plans and targets 3.2. Compare actual productivity and performance with identified short-term budgets, targets and performance results 3.3. Identify and report unsatisfactory performance to relevant personnel, to enable action to be taken to rectify the situation 3.4. Provide coaching to support individuals and teams to use resources effectively, economically and safely 3.5. Support ***consultation processes*** for the development and/or variation of the operational plan as required 3.6. Present recommendations for variation to operational plans to relevant personnel 3.7. Follow performance ***systems***, ***procedures and recording processes*** in accordance with organisation requirements

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

- ability to relate to people from a range of social, cultural and ethnic backgrounds and physical and mental abilities
- coaching and mentoring skills to provide support to colleagues
- functional literacy skills to access and use workplace information
- skills to:
  - maintain a safe workplace and environment
  - access and use feedback to improve operational performance
  - prepare recommendations to improve operations
  - access and use established systems and processes.

Required knowledge

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REQUIRED SKILLS AND KNOWLEDGE

• principles and techniques of:
  • short-term operational scheduling
  • physical resources and services acquisition procedures and/or systems
  • budget and performance figures interpretation
  • performance monitoring within defined job role
  • performance reporting
  • problem identification and resolution
  • alternative approaches to improving resource usage and eliminating resource inefficiencies and waste within defined job role
• relevant legislation from all levels of government that may affect business operations, especially in regard to occupational health and safety and environmental issues, equal opportunity, industrial relations and anti-discrimination
• support for individuals and teams who have difficulty in performing to the required standard.

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Evidence of the following is essential: • sharing information with members of the work team about implementing and monitoring the operational plan • assisting in planning resource acquisition and usage including human resources, risk management and contingency planning • monitoring, analysing and reporting individual and team performance against identified targets.
Context of and specific resources for assessment	Assessment must ensure: • access to appropriate documentation and resources normally used in the workplace.
Method of assessment	A range of assessment methods should be used to assess

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EVIDENCE GUIDE	

	practical skills and knowledge. The following examples are appropriate for this unit:
	• direct questioning combined with review of portfolios of evidence and third party workplace reports of on-the-job performance by the candidate
	• records produced while working with the operational plan, such as:
	  • suggestions for variations to the operational plan
	  • rosters and staff allocation
	  • short-term resource acquisition planning, contingency planning and/or risk management plans
	  • induction programs conducted
	  • suggestions and input into management decisions related to the operational plan
	  • records of actions taken to address day-to-day resource shortfalls.

Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended, for example: • BSBFLM303C Contribute to effective workplace relationships • BSBFLM306C Provide workplace information and resourcing plans • BSBFLM312C Contribute to team effectiveness • BSBCMN311B Maintain workplace safety.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Resource requirements may include:	• purchasing or ordering of goods • stock requirements and requisitions

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RANGE STATEMENT	
	• supply of resources.
Relevant personnel may include:	• colleagues, supervisors and managers • OHS committees and other people with specialist responsibilities • specialist resource managers • unions/employee groups • other employees.
Operational plan may include:	• organisational plans • tactical plans developed by the department or section to detail product and service performance.
Key performance indicators may refer to:	• measures for monitoring or evaluating the efficiency or effectiveness of a system, and which may be used to demonstrate accountability and identify areas for improvements.
Contingency planning may refer to:	• contracting or outsourcing human resource and other functions or tasks • diversification of outcomes • finding cheaper or lower quality raw materials and consumables • increasing sales or production • recycling and re-use • rental, hire purchase or alternative means of procurement of required materials, equipment and stock • restructuring of organisation to reduce labour costs • risk identification, assessment and management processes • seeking further funding • strategies for reducing costs, wastage, stock or consumables • succession planning.
The organisation's policies practices and procedures may include:	• organisational guidelines which govern and prescribe operational functions, such as the acquisition and management of human and physical resources • organisational culture • Standard Operating Procedures • undocumented practices in line with organisational operations.

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RANGE STATEMENT	

Performance systems and processes may be:	• formal or informal processes within the organisation, such as:
	  • Key Performance Indicators (KPIs)
	  • specified work outcomes
	  • individual and team work plans
	  • feedback arrangements
	• informal systems used in the place of existing organisation-wide systems.

Consultation processes may refer to:	• mechanisms used to provide feedback to the work team in relation to outcomes of consultation • meetings, interviews, brainstorming sessions, email/intranet communications, newsletters or other processes and devices which ensure that all employees have the opportunity to contribute to team and individual operational plans.
Performance systems, procedures and recording processes may include:	• databases and other recording mechanisms • individual and team performance plans • organisational policies and procedures relative to performance.

Unit Sector(s)

Unit sector	

Competency field

Competency field	Management and Leadership - Frontline Management

Co-requisite units

Co-requisite units	

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Co-requisite units		

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BSBFLM306C Provide workplace information and resourcing plans

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit describes the performance outcomes, skills and knowledge required to support the information management system. It involves the identification, acquisition, initial analysis and use of appropriate workplace information. No licensing, legislative, regulatory or certification requirements apply to this unit at the time of endorsement.

Application of the Unit

Application of the unit	Frontline managers, in supporting the processes of identifying, acquiring, analysing and using appropriate information, play a significant part in the organisation's effectiveness. At this level, work will normally be carried out within known routines, methods and procedures, and may also involve a number of complex or non routine activities that require some discretion and judgement. This unit is related to BSBINM401A Implement workplace information system.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Locate relevant information	1.1. Identify and locate ***information*** required by teams 1.2. Acquire and review information according to organisational procedures 1.3. Apply ***plans and procedures*** to obtain information which is not immediately available/accessible
2. Collect and report information	2.1. Collect information relevant to the needs of teams in an adequate and timely manner 2.2. Ensure information acquired is in a format suitable for analysis, interpretation and dissemination 2.3. Use information to identify and report relevant trends and developments to ***relevant personnel***, within the limits of own role
3. Use information	3.1. Effectively use ***management information systems*** to

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ELEMENT	PERFORMANCE CRITERIA
systems	store and retrieve data 3.2. Use available ***technology*** to manage information effectively 3.3. Report recommendations for improving information system to ***designated persons and/or groups***
4. Support the preparation of business plan and/or budgets	4.1. Effectively utilise the contribution of the work team when preparing ***business plans and/or budgets*** to gain support for the outcomes 4.2. Present and record information to support the preparation of business plans and/or budgets in accordance with the organisation's guidelines and requirements 4.3. Follow ***contingency plans*** in the event that alternative action is required
5. Support the preparation of resource proposals	5.1. Consult with ***colleagues*** to collect ***resource planning data*** as required 5.2. Report estimated resource needs and usage according to organisational requirements as necessary 5.3. Facilitate ***resourcing*** within limits of own role

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
• ability to relate to people from a range of social, cultural and ethnic backgrounds and physical and mental abilities • coaching and mentoring skills to provide support to colleagues • communication and research skills covering information collection, analysis and reporting • functional literacy skills to access and use workplace information • information preparation skills • skills to improve information usage in decision making • technical skills to extract and input information
Required knowledge
• a general understanding of:

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REQUIRED SKILLS AND KNOWLEDGE
• workplace information systems • operational plans and budgets • resource proposals • basic financial concepts relating operational plans and budgets • methods to gain efficiencies in operational resource management • relevant legislation from all levels of government which may affect business operations, especially in regard to occupational health and safety and environmental issues, equal opportunity, industrial relations and anti-discrimination

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Evidence of the following is essential: • using management information system to collect, store and retrieve data supporting the preparation of business plans and/or budgets • involving the work team in planning and budget preparation • estimating resource needs and usage according to organisational requirements and allocating or acquiring resources within limits of own role.
Context of and specific resources for assessment	Assessment must ensure: • access to appropriate documentation and resources normally used in the workplace.
Method of assessment	A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate for this unit: • direct questioning combined with review of portfolios of evidence and third party workplace reports of on-the-job performance by the candidate • records produced from working in a team, such as:

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EVIDENCE GUIDE	
	• reports • minutes or records of meetings • work journals or diaries • learning and development plans developed with team members • records of actions taken to address issues raised by team members.
Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended, for example: • BSBCUS301A Deliver and monitor a service to customers • BSBFLM305C Support operational plan • BSBFLM312C Contribute to team effectiveness • BSBCMN311B Maintain workplace safety.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Information may include:	• archived, filed and historical background data • continuous improvement and quality assurance data • data available internally or externally • data shared and retrieved in various forms such as in writing or verbally, electronically or manually • financial and contractual data • marketing and customer-related data • organisational performance data • planning and organisational documents • policies and procedures.
Plans and procedures may	• action plans, project plans or more formal

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RANGE STATEMENT	
include:	planning tools in line with organisational procedures and levels of own responsibility • informal documents outlining a series of planned actions or steps • organisational procedures such as Standard Operating Procedures, record keeping procedures • organisational processes and procedures used to obtain information, with consideration given to meeting legislative requirements, such as privacy, anti-discrimination.
Relevant personnel may include:	• colleagues and specialist resource managers • OHS committees and OHS representatives • supervisors, managers and other staff/employees • other people with specialist responsibilities.
Management information systems may be:	• the entire infrastructure of an organisation, including personnel, and the components for the collection, processing, storage, transmission, display, dissemination, and disposition of information.
Technology may include:	• computerised systems and software such as databases, project management and word-processing • telecommunications devices • other technology available in the workplace and used to carry out work roles and responsibilities.
Designated persons or groups may include:	• groups designated in workplace policies and procedures • the frontline manager's supervisors or others with management roles and responsibilities concerning information systems • other stakeholders accessing the information system such as customers and service providers • other work groups or teams whose work will be affected by the system.
Business plans and/or budgets may refer to:	• cash flow projections • long or short term budgets/plans relative to own responsibilities • operational plans

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RANGE STATEMENT	
	• spreadsheet-based financial projections • targets or Key Performance Indicators (KPIs) for production, productivity, wastage, sales, income and expenditure.
Contingency plans will usually be developed by others and may include:	• contracting out or outsourcing human resource and other functions or tasks • diversification of outcomes • finding cheaper or lower quality raw materials and consumables • increasing sales or production • recycling and re-use • rental, hire purchase or alternative means of procurement of required materials, equipment and stock • restructuring of organisation to reduce labour costs • risk identification, assessment and management processes • seeking further funding • strategies for reducing costs, wastage, stock or consumables.
Colleagues may include:	• employees at the same level or more senior managers • OHS representatives • people from a wide variety of social, cultural and ethnic backgrounds and physical and mental abilities • team members.
Resource planning data may relate to:	• buildings/facilities • equipment/technology • finance • information • people • power/energy • targets or Key Performance Indicators (KPIs) for production, productivity, wastage, sales, income and expenditure • time.
Resourcing may include:	• purchasing or ordering of goods • stock requirements/requisitions • supply of resources.

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Unit Sector(s)

Unit sector	

Competency field

Competency field	Management and Leadership - Frontline Management

Co-requisite units

Co-requisite units		

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BSBFLM309C Support continuous improvement systems and processes

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit specifies the outcomes required to support the organisation's continuous improvement systems and processes. Particular emphasis is on actively encouraging the team to participate in the process, on monitoring and reporting on specified outcomes and on supporting opportunities for further improvements. No licensing, legislative, regulatory or certification requirements apply to this unit at the time of endorsement.

Application of the Unit

Application of the unit	This unit replaces BSBFLM309A Support continuous improvement systems and processes. Frontline managers have an active role in supporting continuous improvement processes in achieving the organisation's objectives. Their position, closely associated with the creation and delivery of products and services, means that they have an important responsibility in influencing the ongoing development of the organisation. At this level, work will normally be carried out within known routines, methods and procedures, and may also involve a number of complex or non-routine activities that require some discretion and judgement. Consider co-assessment with BSBFLM305C Support operational plan, BSBFLM312C Contribute to team effectiveness, BSBCUS301A Deliver and monitor a service to customers, BSBCMN311B Maintain workplace safety, and BSBFLM311C Support a workplace learning

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	environment.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Contribute to continuous improvement systems and processes	1.1. Actively encourage and support team members to participate are in decision making processes and to assume responsibility and exercise initiative 1.2. ***Communicate*** the organisation's ***continuous improvement processes*** to individuals and teams

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ELEMENT	PERFORMANCE CRITERIA
	1.3. Effectively utilise ***mentoring and coaching*** to ensure that individuals/teams are able to support the organisation's continuous improvement processes
2. Monitor and report on specified outcomes	2.1. Utilise the organisation's ***systems*** and ***technology*** to monitor team progress and to identify ways in which planning and operations could be improved 2.2. Apply continuous improvement techniques and processes to improve ***customer service***
3. Support opportunities for further improvement	3.1. Communicate ***agreed recommendations*** for improvements in achieving the business plan to team members 3.2. Document and use work performance to identify opportunities for further improvement 3.3. Maintain records, reports and recommendations for improvement within the organisation's systems and processes

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

- ability to relate to people from a range of social, cultural and ethnic backgrounds and physical and mental abilities
- functional literacy skills to access and use workplace information
- research, analysis, interpretation and reporting skills
- monitoring and evaluation skills
- communication skills to:
  - gain the commitment of individuals and teams to continuous improvement
  - deal with people openly and fairly
  - use consultation skills effectively
- skills to consolidate opportunities for improvement
- coaching and mentoring skills to provide support to colleagues

Required knowledge

- legislation from all levels of government that affects business operation, especially in regard to occupational health and safety and environmental issues, equal

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REQUIRED SKILLS AND KNOWLEDGE

opportunity, industrial relations and anti-discrimination
• principles and techniques of:
  • continuous improvement systems and processes
  • benchmarking
  • best practice
• benefits of continuous improvement
• quality approaches which the organisation may implement
• methods that can be used in continuous improvement
• barriers to continuous improvement
• recording, reporting and recommendation processes to facilitate continuous improvement applied within the organisation

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Evidence of the following is essential: • examples of actions taken by the candidate to support continuous improvement including: • use of work performance to identify improvement • adjusted plans to reflect changes • effective communication to all stakeholders • use of technology to monitor operational progress • application of suitable recordkeeping processes.
Context of and specific resources for assessment	Assessment must ensure: • access by the learner and trainer to appropriate documentation and resources normally used in the workplace • that this unit is assessed in the workplace or in a closely simulated work environment.
Method of assessment	A range of assessment methods should be used to assess skills and knowledge. The following examples are appropriate for this unit:

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	• Direct questioning combined with review of portfolios of evidence and third party workplace reports of on-the-job performance by the candidate
	• Review of records supporting the organisation's continuous improvement systems and processes, such as:
	  • contributions to organisational policies and procedures
	  • contributions to procedures and policies for dealing with continuous improvement processes, and related codes of conduct
	  • actions taken to address information collection, retrieval and use in the workplace
	  • actions taken to address issues and problems within work team
	  • actions taken to address methods of reporting information
	  • learning and development plans for team members
	  • materials developed for coaching, mentoring and training
	  • induction programs developed and/or delivered
	  • actions taken to address internal and external information management issues
	  • reviews of people management
	  • advice and input into management decisions related to continuous improvement
	  • records of people management lessons learned.

Guidance information for assessment	This unit should be assessed with other frontline management units taken as part of this qualification, as applicable to the candidate's leadership role in a work team, and as part of a holistic assessment activity.

Range Statement

RANGE STATEMENT
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating

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RANGE STATEMENT	
conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Legislation, codes and national standards relevant to the workplace may include:	• award and enterprise agreements and relevant industrial instruments • relevant legislation from all levels of government that affects business operation, especially in regard to occupational health and safety (OHS) and environmental issues, equal opportunity, industrial relations and anti-discrimination • relevant industry codes of practice.
OHS considerations may include:	• provision of information about OHS legislative requirements and guidelines, and the organisation's OHS policies, procedures and programs • participation in the regular update of OHS systems and procedures • implementation of the continuous improvement processes of the OHS management system • changes to work practices, procedures and the working environment which impact on OHS • organisation's responsibilities to customers and suppliers.
Methods used to ***communicate*** with individuals and team may include:	• verbal, written or electronic communications • on-the-job mentoring and coaching.
Continuous improvement processes may include:	• policies and procedures which allow an organisation to systematically review and improve the quality of its products, services and procedures • cyclical audits and reviews of workplace, team and individual performance • seeking and considering feedback from a range of stakeholders • modifications and improvements to systems, processes, services and products • evaluations and monitoring of effectiveness.
Mentoring and coaching may refer to:	• teaching another member of the team, usually focusing on a specific work task or skill • providing feedback, support and

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RANGE STATEMENT	
	encouragement on a range of matters • providing assistance with problem solving.
Systems may include:	• organisation policies and procedures • web based communication devices • attendance at forums, meetings • newsletters and reports.
Technology may include:	• computerised systems and software such as databases, project management and word-processing • telecommunications devices • any other technology used to carry out work roles and responsibilities.
Customer service may be:	• internal or external, to existing or new clients • identifying needs and priorities in delivering a service to customers • understanding of different levels of customer satisfaction.
Agreed recommendations may be:	• identified improvements arising from the continuous improvement process • determined in accordance with organisational policies and procedures

Unit Sector(s)

Unit sector	

Competency field

Competency field	Management and leadership - Frontline Management

Co-requisite units

Co-requisite units	

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Co-requisite units		

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BSBFLM311C Support a workplace learning environment

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit describes the performance outcomes, skills and knowledge required to effectively encourage and support a learning environment. Particular emphasis is on participation in processes to facilitate and promote learning and to monitor and improve learning performance. No licensing, legislative, regulatory or certification requirements apply to this unit at the time of endorsement.

Application of the Unit

Application of the unit	Frontline managers have a prominent role in encouraging and supporting the development of a learning environment in which work and learning come together. At this level, work will normally be carried out within known routines, methods and procedures, and may also involve a number of complex or non-routine activities that require some discretion and judgement. This unit is related to BSBLED401A Develop teams and individuals.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units	

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Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Encourage a learning environment	1.1. Encourage and support workplace ***learning opportunities*** 1.2. Implement ***learning plans*** as an integral part of individual and team performance plans 1.3. Implement learning plans to reflect ***diversity of needs*** and learning opportunities 1.4. Encourage individual and team access to, and participation in, learning opportunities 1.5. Liaise effectively with ***training and development specialists*** to contribute to learning opportunities which enhance individual, team and organisational performance
2. Encourage and promote learning of team and individuals	2.1. ***Promote a learning culture*** within the team and organisation 2.2. Support ***coaching and mentoring*** for the

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ELEMENT	PERFORMANCE CRITERIA
	development of workplace knowledge, skills and attitudes 2.3. Encourage team members to assess own competencies, and to identify own ***learning and development needs*** 2.4. Share the benefits of learning with others in the team and organisation 2.5. Provide recognition and feedback for ***workplace achievement*** in a timely and appropriate manner
3. Identify opportunities for improvement	3.1. Monitor the performance of individuals and teams to determine the type and extent of required work-based support 3.2. Gather feedback from individuals and teams to identify opportunities for improving future learning arrangements 3.3. Negotiate adjustments with training and development specialists to improve the efficiency and effectiveness of learning 3.4. Record, document and report learning outcomes in accordance with the organisation's systems and procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

- coaching and mentoring skills to support learning
- communication skills to:
  - gain the trust and confidence of colleagues
  - deal with people openly and fairly
  - use consultation skills effectively
- culturally appropriate communication skills to relate to people from a range of social, cultural and ethnic backgrounds and physical and mental abilities
- functional literacy skills to access and use workplace information
- skills in facilitating learning, including:
  - identifying learning needs

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REQUIRED SKILLS AND KNOWLEDGE
• developing learning plans • selecting and using work activities to create learning opportunities • establishing a workplace conducive to learning • negotiating learning arrangements with training and development specialists • encouraging colleagues to share their knowledge and skills • evaluating the effectiveness of learning
Required knowledge

• principles and techniques of:
  • adult learning
  • a learning environment and learning culture
  • work based learning
  • structuring learning
  • coaching and mentoring
• relevant legislation from all levels of government that may affect business operation, especially in regard to:
  • occupational health and safety
  • environmental issues
  • equal opportunity and anti-discrimination
  • industrial relations

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Evidence of the following is essential: • liaising with stakeholders, especially members of the work team, to develop, promote and maintain a workplace learning environment • developing learning plans and arranging learning opportunities in line with identified needs • compiling and interpreting data about learning arrangements and outcomes in accordance with

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EVIDENCE GUIDE	
	organisational requirements.
Context of and specific resources for assessment	Assessment must ensure: • access to appropriate documentation and resources normally used in the workplace.
Method of assessment	A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate for this unit: • direct questioning combined with review of portfolios of evidence and third party workplace reports of on-the-job performance by the candidate • oral or written questioning to assess knowledge and understanding of workplace learning principles and organisational procedures and policies for applying learning systems • presentation of examples of actions taken by the candidate to support a workplace learning environment • review of materials developed for coaching, mentoring and training.
Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended, for example: • BSBCUS301A Deliver and monitor a service to customers • BSBFLM305C Support operational plan • BSBFLM312C Contribute to team effectiveness • BSBCMN311B Maintain workplace safety • BSBWOR301A Organise personal work priorities and development.

Range Statement

RANGE STATEMENT
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and

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RANGE STATEMENT	
regional contexts) may also be included.	

Learning opportunities may include:	• action learning
	• coaching
	• exchange/rotation
	• induction
	• mentoring
	• shadowing
	• short courses
	• structured learning activities conducted outside and within the workplace such as:
	  • accredited training through an independent organisation such as a State OHS authority
	  • training through an RTO leading to a nationally recognised Australian Qualifications Framework (AQF) qualification or Statement of Attainment, for example through a traineeship or Australian Apprenticeship
	• workplace learning activities, that may also contribute to a recognised credential, such as:
	  • workshops.

Learning plans may include:	• codes of conduct • key performance indicators (KPI) • negotiated agreement with individual • OHS requirements • performance standards • team competencies • team roles and responsibilities • work outputs and process.
Diversity of needs may include:	• different learning needs that relate to social, cultural and other types of workplace diversity, such as the need for varied communication styles and approaches.
Training and development specialists may be:	• internal or external.
Promoting a learning culture may include:	• encouraging learning and sharing of skills and knowledge across the work team and the wider organisation in order to develop competencies of team members and the team • informally supporting and recognising

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RANGE STATEMENT	
	learning achievements and sharing success stories • promoting participation and learning opportunities • using formal processes to reward training participation in line with organisational processes • utilising workplace activities as opportunities for learning.
Coaching and mentoring may refer to:	• providing assistance with problem solving • providing feedback, support and encouragement on a range of matters • teaching another member of the team, usually focusing on a specific work task or skill.
Learning and development needs may include:	• developmental learning, for example the learning required to progress through an organisation and take on new tasks and roles • gaps between the competencies held by the employee and the skills and knowledge required to effectively undertake workplace tasks.
Workplace achievement may refer to:	• achievements of set goals and performance outcomes by the work team and/or individuals.

Unit Sector(s)

Unit sector	

Competency field

Competency field	Management and Leadership - Frontline Management

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Co-requisite units

Co-requisite units		

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BSBFLM312C Contribute to team effectiveness

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This specifies the outcomes required to by frontline managers to contribute to the effectiveness of the work team. It involves planning with the team to meet expected outcomes, developing team cohesion, participating in and facilitating the work team, and communicating with the management of the organisation. No licensing, legislative, regulatory or certification requirements apply to this unit at the time of endorsement.

Application of the Unit

Application of the unit	Frontline managers have a key role in developing efficient and effective work teams within the context of the organisation. They play a prominent part in motivating, mentoring, coaching and developing team cohesion by providing leadership for the team and forming the bridge between the management of the organisation and the team members. At this level, work will normally be carried out within known routines, methods and procedures, and may also involve a number of complex or non routine activities that require some discretion and judgement.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Contribute to team outcomes	1.1. Consult team members to identify ***team purpose***, ***roles***, ***responsibilities***, ***goals***, ***plans and objectives*** 1.2. Support team members to meet expected outcomes
2. Support team cohesion	2.1. Encourage team members to participate in the planning, decision making and operational aspects of the work team to their level of responsibility 2.2. Encourage team members to take responsibility for their own work and to assist each other in undertaking required roles and responsibilities 2.3. Provide ***feedback*** to team members to encourage, value and reward team members' efforts and contributions 2.4. Identify and address issues, concerns and problems identified by team members to ***relevant persons*** as

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ELEMENT	PERFORMANCE CRITERIA
	required
3. Participate in work team	3.1. Actively encourage and support team members to participate in team activities and communication processes and to take ***responsibility for their actions***
	3.2. Support the team to identify and resolve problems which impede its performance
	3.3. Utilise own contribution to work team to serve as a role model for others and enhance the organisation's image within the work team, the organisation and with clients/customers
4. Communicate with management	4.1. Maintain open ***communication*** with ***line manager*/*management*** at all times
	4.2. Communicate information from line manager/management to the team
	4.3. Communicate ***unresolved issues*** to line manager/management and follow-up to ensure action is taken in response to these matters

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Required skills

- ability to relate to people from a range of social, cultural and ethnic backgrounds and physical and mental abilities
- communication skills, including listening
- basic training skills, including mentoring and coaching
- planning and organising skills
- problem solving skills
- attributes:
  - empathic
  - communicative
  - self aware
  - supportive
  - trusting

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REQUIRED SKILLS AND KNOWLEDGE
• open • flexible • accommodating • initiating • loyal • fair • adaptable
Required knowledge

Required knowledge
• relevant legislation from all levels of government that affects business operation, especially in regard to occupational health and safety and environmental issues, equal opportunity, industrial relations and anti-discrimination
• organisational policies and procedures
• organisational goals, objectives and plans at both tactical and strategic levels
• organisational structure including organisational chart
• learning and development options available within and through organisation
• a general understanding of the principles and techniques of:
  • group dynamics and processes
  • motivation
  • planning
  • negotiation
• individual behaviour and difference

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Evidence of the following is essential: • demonstrate leadership in contributing to team plans • lead and facilitate teamwork • actively communicate with management • manage communication within the team

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	• induct new team members • implement performance management system • handle problems
Context of and specific resources for assessment	Assessment must ensure: • that this unit can be assessed in the workplace or in a closely simulated work environment • access by the learner and trainer to appropriate documentation and resources normally used in the workplace • where assessment is part of a learning experience, evidence will need to be collected over a period of time, involving both formative and summative assessment • that examples of actions taken by candidate to contribute to team effectiveness are provided

Method of assessment	A range of assessment methods should be used to assess skills and knowledge. The following examples are appropriate for this unit:
	• Direct questioning combined with review of portfolios of evidence and third party workplace reports of on-the-job performance by the candidate
	• Records produced from working in a team, such as:
	  • reports
	  • minutes or records of meetings
	  • work journals or diaries
	  • learning and development plans developed with team members
	  • records of actions taken to address issues raised by team members

Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

Range Statement

RANGE STATEMENT
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating

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RANGE STATEMENT	
conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Legislation, codes and national standards relevant to the workplace may include:	• award and enterprise agreements and relevant industrial instruments • relevant legislation from all levels of government that affects business operation, especially in regard to occupational health and safety (OHS) and environmental issues, equal opportunity, industrial relations and anti-discrimination • relevant industry codes of practice
OHS considerations may include:	• provision of information about OHS legislative requirements, guidelines and the organisation's OHS policies, procedures and programs • training of all employees in health and safety procedures • participation in the regular update of OHS systems and procedures • changes to work practices, procedures and the working environment which impact on OHS
Team purpose, ***roles***, ***responsibilities***, ***goals***, ***plans and objectives*** may include:	• goals for individuals and the work team • expected outcomes and outputs • individual and team performance plans and Key Performance Indicators (KPIs) • action plans, business plans and operational plans linked to strategic plans • OHS responsibilities
Feedback may refer to:	• communication of ideas and thoughts which focus on specific tasks, outcomes, decisions, issues or behaviours • formal/informal gatherings between team members where there is discussion on work-related matters
Relevant persons may include:	• frontline manager's direct superior or other management representatives • colleagues • designated personnel e.g. safety officer
Responsibility for their actions	• individuals and teams • individual and joint actions

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RANGE STATEMENT	
may involve:	
Communication may include:	• verbal, written or electronic communication • face-to-face • formal/informal interaction
Line manager*/*management may refer to:	• frontline manager's direct superior or other management representatives
Unresolved issues may include:	• issues, concerns and tensions • problems related to work roles and responsibilities • grievances and complaints • any matters affecting workplace relationships and team cohesion

Unit Sector(s)

Unit sector	

Competency field

Competency field	Management and Leadership - Frontline Management services

Co-requisite units

Co-requisite units		

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BSBINN301A Promote innovation in a team environment

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit describes the performance outcomes, skills and knowledge required to be an effective and pro active member of an innovative team. No licensing, legislative, regulatory or certification requirements apply to this unit at the time of endorsement.

Application of the Unit

Application of the unit	This unit applies individuals who play a pro active role in demonstrating, encouraging or supporting innovation in a team environment. The individual may be a team participant or a team leader. The team may 'make itself' or be constructed by others. It may have core members and members who participate at certain times or for particular purposes. It may be permanent or temporary, or come together at different times to work on specific projects. The team could consist of a team of contractors/freelancers, permanent staff, clients and service providers, or any combination of these groups. It may operate within an organisation or across several organisations - or simply across a group of individuals. The key focus of the unit is on what makes for an innovative team, what keeps it working well, how the structure of work can make a difference and what skills and knowledge are needed to maximise opportunities for innovation. Where a greater focus on team leadership is required this unit should be combined with units such as BSBLED401A Develop teams and individuals.

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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Create opportunities to maximise innovation within the team	1.1. Evaluate and reflect on ***what the team needs and wants to achieve*** 1.2. Check out ***information about current or potential team members' work*** in the context of developing a more innovative team 1.3. Bring people into the team or make suggestions for team members based on what needs to be achieved and the potential for cross-fertilising ideas 1.4. Acknowledge, respect and discuss the ***different ways that different people may contribute*** to building or

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ELEMENT	PERFORMANCE CRITERIA
	enhancing the team
2. Organise and agree effective ways of working	2.1. Jointly establish ***ground rules*** for how the team will operate 2.2. Agree and communicate responsibilities in ways that encourage and reinforce ***team-based innovation*** 2.3. Agree and share tasks and activities to ensure the best use of skills and abilities within the team 2.4. Plan and schedule activities to allow time for thinking, challenging and collaboration 2.5. Establish personal reward and stimulation as an integral part of the team's way of working
3. Support and guide colleagues	3.1. Model ***behaviour that supports innovation*** 3.2. Seek ***external stimuli and ideas*** to feed into team activities 3.3. Pro-actively share information, knowledge and experiences with other team members 3.4. Challenge and test ideas within the team in a positive and collaborative way 3.5. Pro-actively discuss and explore ideas with other team members on an ongoing basis
4. Reflect on how the team is working	4.1. De-brief and reflect on activities and on opportunities for improvement and innovation 4.2. Gather and use feedback from within and outside the team to generate discussion and debate 4.3. Discuss the ***challenges of being innovative*** in a constructive and open way 4.4. Take ideas for improvement, build them into future activities and communicate key issues to relevant colleagues 4.5. Identify, promote and celebrate successes and examples of successful innovation

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills

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REQUIRED SKILLS AND KNOWLEDGE
• communication skills to work collaboratively as part of a team, to provide guidance and support to others, and to participate in open and constructive discussions • creative thinking skills to generate, explore, test and challenge ideas • learning skills to stretch boundaries of own knowledge and skills • literacy skills to analyse a wide range of information from varied sources • planning and organisational skills to participate in the effective allocation of work in a team context • problem-solving skills to work constructively to overcome issues and challenges of both a practical and conceptual nature and to make ideas become realities • self-management skills to take a pro-active team role and to reflect on own performance in modelling and encouraging behaviour that supports innovation.
Required knowledge
• barriers to innovation that can occur within a team and broader barriers that sometimes hinder innovation • broad concepts of innovation including what innovation is, different types of innovation and the benefits of innovation • characteristics of teams that are more likely to be innovative and characteristics of broader environments that support and encourage innovation • different roles that people may play within a team, how this impacts on the way a team works and what it might achieve • group dynamics in a team.

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Evidence of the following is essential: • active participation in a team where the team takes a pro-active and considered approach to innovation and innovative practice • collaborative and open communication within the team • knowledge and understanding of the internal and external factors that contribute to a team becoming

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EVIDENCE GUIDE	
	and remaining innovative.
Context of and specific resources for assessment	Assessment must ensure: • demonstration of skills as part of a team.
Method of assessment	A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate for this unit: • direct questioning combined with review of portfolios of evidence and third party workplace reports of on-the-job performance by the candidate • direct observation of team interactions • evaluation of reports by the candidate or the team (could be oral or written) discussing the ideas, challenges and opportunities associated with teams, and how they can be more innovative • evaluation of feedback from other people in the team about the candidate's communication approaches and abilities • oral or written questioning to assess knowledge of the characteristics of innovative teams, innovation concepts more broadly and they ways in which innovation can be encouraged • review of jointly established 'groundrules' for how the team will operate.
Guidance information for assessment	Innovation does not occur in isolation. Holistic assessment with other units relevant to the industry sector, workplace and job role is highly recommended.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
What the team needs and wants to achieve may relate to:	• addressing particular customer feedback • conceiving and implementing a particular

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RANGE STATEMENT	
	project • developing new services or products • generating ongoing ideas within the work unit • improving budgetary performance • improving or changing work conditions • new ideas that impact beyond the workplace (e.g. that have a broader social or community impact)
Information about current or potential team members' work may relate to:	• interests • lifestyle preferences • past jobs • technical strengths • work preferences • working styles
Different ways that different people may contribute may relate to individual strengths around:	• creating positive energy within the team • fundamental literacy strengths (e.g. particularly strong in visual literacy, written or spoken communication) • generating ideas • networks or spheres of influence • particular ways of thinking • powers of persuasion • problem-solving capacities • specific technical skills or knowledge
Ground rules may relate to:	• boundaries or lack of boundaries for team activities and ideas • confidentiality • copyright, moral rights or intellectual property • regularity of communication • key roles and responsibilities • time lines • ways of communicating
Team-based innovation may be encouraged through:	• accessing training and learning opportunities • enough but not too much guidance and structure • equitable sharing of workload • follow-through with ideas • supportive communication
Behaviour that supports innovation may include being:	• collaborative • equitable

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RANGE STATEMENT	
	• fair • fun • hardworking • reflective • responsible • sympathetic
External stimuli and ideas might be from:	• Australia or overseas • colleagues outside of the team • family and friends • internet • journals • networks or technical experts • other organisations
Challenges of being innovative may relate to:	• budgetary or other resource constraints • competing priorities • organisational culture • problems with breaking old patterns of behaviour or thinking • time pressures

Unit Sector(s)

Unit sector	

Competency field

Competency field	Creativity and Innovation - Innovation

Co-requisite units

Co-requisite units		

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Co-requisite units		

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BSBWOR301B Organise personal work priorities and development

Modification History

Release	Comments
Release 1	This version first released with *BSB07 Business Training Package version 6.0* Revised unit. Performance criteria and required skills updated to focus on learning and development practices, KPIs and compliance with policy and procedures. Replaces BSBWOR301A Organise personal work priorities and development

Unit Descriptor

This unit describes the performance outcomes, skills and knowledge required to organise own work schedules, to monitor and obtain feedback on work performance, and to maintain required levels of competence. Operators may exercise discretion and judgement using appropriate theoretical knowledge of work scheduling and performance improvement to provide technical advice and support to a team.

Application of the Unit

This unit applies to individuals who are skilled operators and apply a broad range of competencies in various work contexts.

Licensing/Regulatory Information

No licensing, legislative, regulatory or certification requirements apply to this unit at the time of endorsement.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

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Elements and Performance Criteria Pre-Content

Element	**Performance Criteria**
Elements describe the essential outcomes of a unit of competency.	*Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.*

Elements and Performance Criteria

1. Organise and complete own work schedule	1.1 Ensure that ***work goals, objectives*** or ***KPIs*** are understood, negotiated and agreed in accordance with ***organisational requirements***
	1.2 Assess and prioritise workload to ensure tasks are completed within identified timeframes
	1.3 Identify ***factors affecting the achievement of work objectives*** and incorporate contingencies into work plans
	1.4 Use ***business technology*** efficiently and effectively to manage and monitor scheduling and completion of tasks
2. Monitor own work performance	2.1 Accurately monitor and adjust personal work performance through self-assessment to ensure achievement of tasks and compliance with legislation and work processes or KPIs
	2.2 Ensure that ***feedback on performance*** is actively sought and evaluated from colleagues and clients in the context of individual and group requirements
	2.3 Routinely identify and report on variations in the quality of and ***products and services*** according to organisational requirements
	2.4 Identify ***signs of stress*** and effects on ***personal wellbeing***
	2.5 Identify ***sources of stress*** and access appropriate ***supports and resolution strategies***
3. Coordinate personal skill development and learning	3.1 Identify personal learning and professional development needs and skill gaps using self-assessment and advice from colleagues and clients in relation to role and organisational requirements
	3.2 Identify, prioritise and plan opportunities for undertaking personal skill development activities in liaison with work groups and relevant personnel
	3.3 Access, complete and record ***professional development***

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	opportunities to facilitate continuous learning and career development 3.4 Incorporate formal and informal feedback into review of further learning needs

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

- communication skills to give and receive constructive feedback relating to development needs
- literacy skills to read and understand the organisation's procedures
- planning skills to organise work priorities according to work goals and objectives
- problem-solving skills to solve routine problems
- self-management skills to:
  - comply with policies and procedures
  - consistently evaluate and monitor own performance
  - seek learning opportunities.

Required knowledge

- key provisions of relevant legislation from all levels of government that may affect aspects of business operations, such as:
  - anti-discrimination legislation
  - ethical principles
  - codes of practice
  - privacy laws
  - occupational health and safety (OHS)
- organisational policies, plans and procedures
- methods to elicit, analyse and interpret feedback
- principles and techniques of goal setting, measuring performance, time management and personal assessment
- competency standards and how to interpret them in relation to self
- methods to identify and prioritise personal learning needs.

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Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Evidence of the following is essential: • preparing work plans • scheduling and prioritising work objectives and tasks • knowledge of the principles and techniques of goal setting, measuring performance, time management and personal assessment.
Context of and specific resources for assessment	Assessment must ensure: • access to an actual workplace or simulated environment • access to office equipment and resources • examples of work schedules and performance improvement plans.
Method of assessment	A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate for this unit: • direct questioning combined with review of portfolios of evidence and third party workplace reports of on-the-job performance by the candidate • review of self-assessment documentation outlining learning and development needs • analysis of responses to case studies and scenarios • demonstration of techniques • oral or written questioning to assess knowledge of methods to identify and prioritise personal learning needs • evaluation of planning for personal skill development activities and professional development opportunities.
Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

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Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Work goals and objectives may include:	• budgetary targets • production targets • reporting deadlines • sales targets • team and individual learning goals • team participation.
KPIs may include:	• key performance indicators on customer satisfaction • key performance indicators on customer effort • monitoring time taken to answer calls • operating within reporting protocols • score tools such as net promoter • understanding metrics.
Organisational requirements may include:	• access and equity principles and practice • business and performance plans • defined resource parameters • ethical standards • goals, objectives, plans, systems and processes • legal and organisational policies, guidelines and requirements • OHS policies, procedures and programs • quality and continuous improvement processes and standards • quality assurance and/or procedures manuals.
Factors affecting the achievement of work objectives may include:	• budget constraints • competing work demands • environmental factors such as time, weather • resource and materials availability • technology/equipment breakdowns • unforeseen incidents • workplace hazards, risks and controls.
Business technology may include:	• computer applications • computers • email

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	• facsimile machines • internet/extranet/intranet • modems • personal schedulers • photocopiers • printers • scanners.
Feedback on performance may include:	• formal/informal performance appraisals • obtaining feedback from clients • obtaining feedback from supervisors and colleagues • personal, reflective behaviour strategies • routine organisational methods for monitoring service delivery.
Products and services may include:	• either products or services • goods • ideas • infrastructure • private or public sets of benefits.
Signs of stress may include:	• absence from work • alcohol or other substance abuse • conflict • poor work performance.
Personal wellbeing may include:	• cultural • emotional • social • spiritual.
Sources of stress may include:	• complex tasks • cultural issues • work and family conflict • workloads.
Supports and resolution strategies may include:	• awareness raising • counselling • employee assistance programs (EAP) • family support • group activities • job design • mediation • sharing load • time off • training.
Professional development	• career planning/development

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opportunities may include:	• coaching, mentoring and/or supervision • formal/informal learning programs • internal/external training provision • performance appraisals • personal study • quality assurance assessments and recommendations • recognition of current competence/skills recognition • work experience/exchange/opportunities • workplace skills assessment.

Unit Sector(s)

Industry Capability – Workplace Effectiveness

Custom Content Section

Not applicable.

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BSBCUS401B Coordinate implementation of customer service strategies

Modification History

Release	Comments
Release 1	This version first released with *BSB07 Business Training Package version 6.0.* Revised unit. Performance criteria amended so that the learner is not required to 'incorporate evidence of customer satisfaction in decision to modify products or services'. Required skills updated to focus on learning and development practices and compliance with policy and procedures. Replaces BSBCUS401A Coordinate implementation of customer service strategies

Unit Descriptor

This unit describes the performance outcomes, skills and knowledge required to advise on, carry out and evaluate customer service strategies, including the design of improvement strategies based on feedback. Operators may have responsibility to provide guidance or to delegate aspects of these tasks to others.

Application of the Unit

This unit applies to individuals with a broad knowledge of customer service strategies who contribute well developed skills in addressing customer needs and problems.

Licensing/Regulatory Information

No licensing, legislative, regulatory or certification requirements apply to this unit at the time of endorsement.

Pre-Requisites

Not applicable.

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Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Element	**Performance Criteria**
Elements describe the essential outcomes of a unit of competency.	*Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.*

Elements and Performance Criteria

1. Advise on customer service needs	1.1 Clarify and accurately assess ***customer needs*** using appropriate ***communication techniques***
	1.2 Diagnose problems matching service delivery to ***customers*** and develop options for improved service within ***organisational requirements***
	1.3 Provide relevant and constructive advice to promote the improvement of customer service delivery
	1.4 Use ***business technology*** and/or ***online services*** to structure and present information on customer service needs
2. Support implementation of customer service strategies	2.1 Ensure customer service strategies and opportunities are promoted to ***designated individuals and groups***
	2.2 Identify and allocate available budget resources to fulfil customer service objectives
	2.3 Promptly action ***procedures to resolve customer difficulties*** and ***complaints*** within organisational requirements
	2.4 Ensure that decisions to implement ***strategies*** are taken in consultation with designated individuals and groups
3. Evaluate and report on customer service	3.1 Review client satisfaction with service delivery using verifiable data in accordance with organisational requirements
	3.2 Identify and report changes necessary to maintain service standards to designated individuals and groups
	3.3 Prepare conclusions and recommendations from verifiable evidence and provide constructive advice on future directions of

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	client service strategies 3.4 Maintain systems, records and reporting procedures to compare changes in customer satisfaction

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

- communication skills to
  - communicate effectively with personnel and clients at all levels
  - articulate customer service strategies
- interpersonal skills to:
  - build relationships with customers
  - establish rapport
- literacy skills to:
  - prepare general information and papers
  - read a variety of texts
  - write formal and informal letters according to target audience
- planning skills to develop implementation schedules
- problem-solving skills to diagnose organisational problems relating to customer services
- self-management skills to:
  - comply with policies and procedures
  - consistently evaluate and monitor own performance
  - seek learning opportunities.

Required knowledge

- key provisions of relevant legislation from all levels of government that may affect aspects of business operations, such as:
  - anti-discrimination legislation
  - ethical principles
  - codes of practice
  - privacy laws
  - environmental issues
  - occupational health and safety (OHS)
- principles of customer service
- organisational business structure, products and services
- product and service standards and best practice models.

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Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Evidence of the following is essential: • identifying needs and priorities of the organisation in delivering services to customers • responding to and reporting on customer feedback • designing strategies to improve delivery of products and services • knowledge of the principles of customer service.
Context of and specific resources for assessment	Assessment must ensure: • access to an actual workplace or simulated environment • access to office equipment and resources • examples of customer complaints, feedback and strategies.
Method of assessment	A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate for this unit: • direct questioning combined with review of portfolios of evidence and third party workplace reports of on-the-job performance by the candidate • review of documentation reporting changes necessary to maintain service standards • analysis of responses to case studies and scenarios • demonstration of techniques • observation of presentations • oral or written questioning to assess knowledge of customer service techniques and strategies • review of systems, records and reporting procedures to compare changes in customer satisfaction.
Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

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Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Customer needs may relate to:	• accuracy of information • advice or general information • complaints • fairness/politeness • further information • making an appointment • prices/value • purchasing organisation's products and services • returning organisation's products and services • specific information.
Communication techniques may include:	• analysing customer satisfaction surveys • analysing quality assurance data • conducting interviews • consultation methods, techniques and protocols • making recommendations • obtaining management decisions • questioning • seeking feedback to confirm understanding • summarising and paraphrasing.
Customers may include:	• corporate customers • individual members of the organisation • individual members of the public • internal or external • other agencies.
Organisational requirements may include:	• access and equity principles and practice • anti-discrimination and related policy • confidentiality and security requirements • defined resource parameters • ethical standards • goals, objectives, plans, systems and processes • legal and organisational policies, guidelines and requirements • OHS policies, procedures and programs

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	• payment and delivery options • pricing and discount policies • quality and continuous improvement processes and standards • quality assurance and/or procedures manuals • replacement and refund policy and procedures • who is responsible for products or services.
Business technology may include:	• answering machine • binder • computer • fax machine • photocopier • printer • shredder • telephone.
Online services may include:	• access to product database by customers online • access to purchase, delivery and account records • contact centre • online ordering • online payments • online registration • quick/reasonable response • two-way communication online.
Designated individuals and groups may include:	• colleagues • committee • customers • external organisation • line management • supervisor.
Procedures to resolve customer difficulties may include:	• external agencies (e.g. Ombudsman) • item replacement • referrals to supervisor • refund of monies • review of products or services • using conflict management techniques.

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Customer complaints may include:	• administrative errors such as incorrect invoices or prices
	• customer satisfaction with service quality
	• damaged goods or goods not delivered
	• delivery errors
	• products not delivered on time
	• service errors
	• specific e-business problems and issues:
	  • difficulty accessing services
	  • inactive links
	  • not appreciating differing hardware and software
	  • services not available
	  • supply errors such as incorrect product delivered
	  • time taken to access services
	  • unfriendly website design
	  • website faults
	• warehouse or store room errors such as incorrect product delivered.

Customer service ***strategies*** may include:	• courtesy/politeness • delivery times • merchandise characteristics • price offers • product/refund guarantees • product/service availability.

Unit Sector(s)

Stakeholder Relations – Customer Service

Custom Content Section

Not applicable.

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BSBINM401A IMPLEMENT WORKPLACE INFORMATION SYSTEM

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit describes the performance outcomes, skills and knowledge required to implement the workplace information system. It involves the identification, acquisition, initial analysis and use of appropriate information, which plays a significant part in the organisation's effectiveness. No licensing, legislative, regulatory or certification requirements apply to this unit at the time of endorsement.

Application of the Unit

Application of the unit	Frontline managers play a significant role in contributing to the organisation's effectiveness in identifying, acquiring, analysing and using appropriate information. At this level, work will normally be carried out within routine and non routine methods and procedures, which require planning and evaluation, leadership and guidance of others, and some discretion and judgement.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

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Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Identify and source information needs	1.1. Determine and locate ***information*** required by teams 1.2. Acquire and review information held by the organisation to determine suitability, accessibility, currency and reliability according to ***organisational policies***
2. Collect, analyse and report information	2.1. Collect information, which is adequate and relevant to the needs of teams, in a timely manner 2.2. Ensure information is in a format suitable for analysis, interpretation and dissemination 2.3. Analyse information to identify and report relevant trends and developments in terms of the needs for which it was acquired
3. Implement information systems	3.1. Implement management information systems effectively to store, retrieve and regularly review data for decision making purposes 3.2. Use ***technology*** available in the work area to manage information effectively

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ELEMENT	PERFORMANCE CRITERIA
	3.3. Submit recommendations for improving the information system to ***designated persons and/or groups***
4. Prepare for information system changes	4.1. Collect information about information system future needs in consultation with ***colleagues***, including those who have a specialist role in resource management 4.2. Ensure estimates of information system future needs reflect the organisation's ***business plans***, and customer and supplier requirements 4.3. Support proposals to secure resources by clearly presenting submissions that describe realistic options, benefits, costs and outcomes 4.4. Prepare team members to work with new technology and information system changes

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

- literacy skills to work with information, and to research and present information in ways that are appropriate to the work team
- technology skills to work with a range of information systems.

Required knowledge

- information management systems and technology that would be associated with the workplace such as:
  - budgets and financial management systems
  - customer information software or records
  - databases
  - personal digital assistant (PDA)
  - product and service information
  - project management software
  - record management systems
  - spreadsheets.

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Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Evidence of the following is essential: • analysis of the information that is required for the effective functioning of the team's work together • knowledge of the range of information systems that are, or should be, available in the workplace • ability to recognise what information system changes and improvements will be required in the future.
Context of and specific resources for assessment	Assessment must ensure: • access to appropriate documentation and resources normally used in the workplace.
Method of assessment	A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate for this unit: • demonstration of techniques in working with information management systems • direct questioning combined with review of portfolios of evidence and third party workplace reports of on-the-job performance by the candidate • oral or written questioning to assess knowledge of relevant technology • review of documentation analysing information trends and developments • written reports on future information system needs • review of preparation undertaken for team members to work with new technology and information system changes.
Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended, for example: • other units from the Certificate IV in Frontline Management.

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Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Information may include:	• archived, filed and historical background data • continuous improvement and quality assurance data • data available internally or externally • data shared and retrieved in various forms such as in writing or verbally, electronically or manually • financial and contractual data • marketing and customer-related data • organisational performance data • planning and organisational documents • policies and procedures
Organisational policies may include:	• guidelines for decision making throughout the organisation that link the formulation of strategy with its implementation • sets of accepted actions approved by the organisation • Standard Operating Procedures
Technology may include:	• computerised systems and software such as databases, project management and word processing • telecommunications devices • any other technology used to carry out work roles and responsibilities
Designated persons and/or groups may include:	• groups designated in workplace policies and procedures • managers or supervisors with management roles and responsibilities concerning information systems • other stakeholders accessing the information system such as customers and service providers • other work groups or teams whose work will be affected by the system

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RANGE STATEMENT	
Colleagues may include:	• employees at the same level or more senior managers • occupational health and safety committee members and other specialists • people from a range of social, cultural and ethnic backgrounds and with a range of physical and mental abilities • team members
Business plans may include:	• cash flow projections • long-term budgets/plans • operational plans • short-term budgets/plans • spreadsheet-based financial projections • targets or key performance indicators for production, productivity, wastage, sales, income and expenditure

Unit Sector(s)

Unit sector	

Competency field

Competency field	Management and Leadership - Management

Co-requisite units

Co-requisite units		

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BSBLED401A Develop teams and individuals

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit describes the performance outcomes, skills and knowledge required to determine individual and team development needs and to facilitate the development of the workgroup. No licensing, legislative, regulatory or certification requirements apply to this unit at the time of endorsement.

Application of the Unit

Application of the unit	This unit applies to individuals with a broad knowledge of learning and development who apply their skills in addressing development needs to meet team objectives. They may have responsibility to provide guidance or to delegate aspects of tasks to others.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

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Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Determine development needs	1.1. Systematically identify and implement ***learning and development needs*** in line with ***organisational requirements*** 1.2. Ensure that a learning plan to meet individual and group training and development needs is collaboratively developed, agreed to and implemented 1.3. Encourage individuals to self-evaluate performance and identify areas for improvement 1.4. Collect ***feedback on performance*** of team members from relevant sources and compare with established team learning needs
2. Develop individuals and teams	2.1. Identify learning and development program goals and objectives, ensuring a match to the specific knowledge and skill requirements of competency standards relevant to the industry 2.2. Ensure that ***learning delivery methods*** are appropriate to the learning goals, the learning style of participants, and availability of ***equipment and resources*** 2.3. Provide workplace learning opportunities, and ***coaching and mentoring assistance*** to facilitate individual and team achievement of competencies 2.4. Create development opportunities that incorporates a

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ELEMENT	PERFORMANCE CRITERIA
	range of activities and support materials appropriate to the achievement of identified competencies 2.5. Identify and approve resources and time lines required for learning activities in accordance with organisational requirements
3. Monitor and evaluate workplace learning	3.1. Use feedback from individuals or teams to identify and implement improvements in future learning arrangements 3.2. Assess and record outcomes and performance of individuals/teams to determine the effectiveness of development programs and the extent of additional development support 3.3. Negotiate modifications to learning plans to improve the efficiency and effectiveness of learning 3.4. Document and maintain records and reports of competency according to organisational requirements

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

- communication skills to receive and report on feedback, to maintain effective relationships and to manage conflict
- culturally appropriate communication skills to relate to people from diverse backgrounds and people with diverse abilities
- leadership skills to gain trust and confidence of clients and colleagues
- literacy skills to read, write and understand a variety of texts; and to edit and proofread documents to ensure clarity of meaning, accuracy and consistency of information
- negotiation skills to achieve mutually acceptable outcomes
- technology skills to support effective communication and presentation.

Required knowledge

- key provisions of relevant legislation from all levels of government that may affect aspects of business operations, such as:
  - anti-discrimination legislation
  - ethical principles

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REQUIRED SKILLS AND KNOWLEDGE
• codes of practice • privacy laws • occupational health and safety (OHS) • facilitation techniques to encourage team development and improvement • organisational policies, plans and procedures • career paths and competency standards relevant to the industry.

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Evidence of the following is essential: • identifying and implementing learning opportunities for others • giving and receiving feedback from team members to encourage participation in and effectiveness of team • creating learning plans to match skill needs • knowledge of relevant legislation.
Context of and specific resources for assessment	Assessment must ensure: • access to an actual workplace or simulated environment • access to office equipment and resources • examples of learning and development plans, policies and procedures • examples of documents relating to diversity policies and procedures.
Method of assessment	A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate for this unit: • direct questioning combined with review of portfolios of evidence and third party workplace reports of on-the-job performance by the candidate • analysis of responses to case studies and scenarios

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EVIDENCE GUIDE	
	• oral or written questioning to assess knowledge of career paths and competency standards relevant to the industry • review of records and reports of competency.
Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended, for example: • management units • other learning and development units.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Learning and development needs may include:	• career planning/development • coaching, mentoring and/or supervision • formal/informal learning programs • internal/external training provision • performance appraisals • personal study • recognition of current competence/skills recognition • work experience/exchange/opportunities • workplace skills assessment
Organisational requirements may include:	• access and equity principles and practices • anti-discrimination and related policy • business and performance plans • confidentiality and security requirements • defined resource parameters • ethical standards • goals, objectives, plans, systems and processes • legal and organisational policies, guidelines and requirements

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RANGE STATEMENT	
	• OHS policies, procedures and programs • quality and continuous improvement processes and standards • quality assurance and/or procedures manuals
Feedback on performance may include:	• formal/informal performance appraisals • obtaining feedback from clients • obtaining feedback from supervisors and colleagues • personal, reflective behaviour strategies • routine organisational methods for monitoring service delivery
Learning delivery methods may include:	• conference and seminar attendance • formal course participation • induction • involvement in professional networks • on-the-job coaching or mentoring • presentations/demonstrations • problem-solving • work experience
Equipment and resources may include:	• facilities • funding • guest speakers • technological tools and equipment • time • training equipment such as whiteboards and audio-visual equipment
Coaching and mentoring assistance may include:	• fair and ethical practice • non-discriminatory processes and activities • presenting and promoting a positive image of the collective group • problem-solving • providing encouragement • providing feedback to another team member • respecting the contribution of all participants and giving credit for achievements

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Unit Sector(s)

Unit sector	

Competency field

Competency field	Workforce Development - Learning and Development

Co-requisite units

Co-requisite units		

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BSBMGT402A Implement operational plan

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit describes the performance outcomes, skills and knowledge required to implement the operational plan by monitoring and adjusting operational performance, producing short term plans for the department/section, planning and acquiring resources and providing reports on performance as required. No licensing, legislative, regulatory or certification requirements apply to this unit at the time of endorsement.

Application of the Unit

Application of the unit	Frontline managers are actively engaged in planning activities to achieve the measurable, stated objectives of the team and the organisation. This key role is carried out to provide safe, efficient and effective products and services to customer satisfaction within the organisation's productivity and profitability plans. At this level, work will normally be carried out within routine and non routine methods and procedures, which require planning, evaluation, leadership and guidance of others.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

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Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Implement operational plan	1.1. Collate, analyse and organise details of ***resource requirements*** in consultation with ***relevant personnel***, ***colleagues and specialist resource managers*** 1.2. Implement ***operational plans*** to contribute to the achievement of organisation's performance/business plan 1.3. Identify and use ***key performance indicators*** (KPIs) to monitor operational performance 1.4. Undertake ***contingency planning*** and ***consultation processes*** 1.5. Provide assistance in the development and presentation of proposals for resource requirements in line with operational planning processes
2. Implement resource acquisition	2.1. Recruit and induct employees within ***organisation's policies***, ***practices and procedures*** 2.2. Implement plans for acquisition of physical

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ELEMENT	PERFORMANCE CRITERIA
	resources and services within organisation's policies, practices and procedures and in consultation with relevant personnel
3. Monitor operational performance	3.1. Monitor ***performance systems and processes*** to assess progress in achieving profit/productivity plans and targets 3.2. Analyse and use budget and actual financial information to monitor profit/productivity performance 3.3. Identify unsatisfactory performance and take prompt action to rectify the situation according to organisational policies 3.4. Provide mentoring, coaching and supervision to support individuals and teams to use resources effectively, economically and safely 3.5. Present recommendations for variation to operational plans to the ***designated persons***/***groups*** and gain approval 3.6. Implement ***systems***, ***procedures and records*** associated with performance in accordance with organisation's requirements

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

- coaching and mentoring skills to provide support to colleagues
- literacy skills to access and use workplace information, and to prepare reports
- planning and organising skills to monitor performance and to sequence work of self and others to achieve planned outcomes.

Required knowledge

- principles and techniques associated with:
  - contingency planning
  - methods for monitoring and reporting on performance
  - monitoring and implementing operations and procedures
  - problem identification and methods of resolution

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REQUIRED SKILLS AND KNOWLEDGE
• relevant budgeting and financial analysis, interpretation and reporting requirements • resource management systems at the tactical implementation level • resource planning and acquisition • tactical risk analysis including identification and reporting requirements.

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Evidence of the following is essential: • ability to monitor and adjust operational performance, produce short-term plans for the department or section, plan and acquire resources, and provide reports on performance as required • knowledge of principles and techniques associated with monitoring and implementing operations and procedures.
Context of and specific resources for assessment	Assessment must ensure: • access to appropriate documentation and resources normally used in the workplace.
Method of assessment	A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate for this unit: • direct questioning combined with review of portfolios of evidence and third party workplace reports of on-the-job performance by the candidate • review of documentation outlining contingency planning and consultation processes undertaken • demonstration of techniques in managing performance • evaluation of mentoring, coaching and supervision provided to support individuals and teams to use resources effectively, economically and safely.

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EVIDENCE GUIDE	
Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended, for example: • other units from the Certificate IV in Frontline Management.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Resource requirements may refer to:	• goods and services to be purchased and ordered • human, physical and financial resources - both current and projected • stock requirements and requisitions
Relevant personnel, ***colleagues and specialist resource managers*** may include:	• colleagues and specialist resource managers • managers • occupational health and safety committees and other people with specialist responsibilities • other employees • people from a wide range of social, cultural and ethnic backgrounds, and people with a range of physical and mental abilities • supervisors
Operational plans may refer to:	• organisational plans • tactical plans developed by the department or section to detail product and service performance
Key performance indicators may refer to:	• measures for monitoring or evaluating the efficiency or effectiveness of a system, and which may be used to demonstrate accountability and to identify areas for improvements

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RANGE STATEMENT	
Contingency planning may refer to:	• contracting out or outsourcing human resources and other functions or tasks • diversification of outcomes • finding cheaper or lower quality raw materials and consumables • increasing sales or production • recycling and re-use • rental, hire purchase or alternative means of procurement of required materials, equipment and stock • restructuring of organisation to reduce labour costs • risk identification, assessment and management processes • seeking further funding • strategies for reducing costs, wastage, stock or consumables • succession planning
Consultation processes may refer to:	• mechanisms used to provide feedback to the work team in relation to outcomes of consultation • meetings, interviews, brainstorming sessions, email/intranet communications, newsletters or other processes and devices which ensure that all employees have the opportunity to contribute to team and individual operational plans
Organisation's policies, ***practices and procedures*** may include:	• organisational culture • Standard Operating Procedures • organisational guidelines which govern and prescribe operational functions, such as the acquisition and management of human and physical resources • undocumented practices in line with organisational operations

Performance systems and processes may refer to:	• informal systems used by frontline managers for the work team in the place of existing organisation-wide systems
	• formal processes within the organisation to measure performance, such as:
	  • feedback arrangements
	  • individual and teamwork plans

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RANGE STATEMENT	
	• KPIs • specified work outcomes
Designated persons*/*groups may include:	• other affected work groups or teams and groups designated in workplace policies and procedures • those who have the authority to make decisions and/or recommendations about operations such as workplace supervisors, other managers
Systems*, *procedures and records may include:	• databases and other recording mechanisms for ensuring records are kept in accordance with organisational requirements • individual and team performance plans • organisational policies and procedures relative to performance

Unit Sector(s)

Unit sector	

Competency field

Competency field	Management and Leadership - Management

Co-requisite units

Co-requisite units		

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BSBMGT403A Implement continuous improvement

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit describes the performance outcomes, skills and knowledge required to implement the organisation's continuous improvement systems and processes. Particular emphasis is on using systems and strategies to actively encourage the team to participate in the process, monitoring and reviewing performance, and identifying opportunities for further improvements. No licensing, legislative, regulatory or certification requirements apply to this unit at the time of endorsement.

Application of the Unit

Application of the unit	Frontline managers have an active role in implementing the continuous improvement process to achieve the organisation's objectives. Their position, closely associated with the creation and delivery of products and services, means that they have an important role in influencing the ongoing development of the organisation. At this level, work will normally be carried out within routine and non routine methods and procedures, which require planning and evaluation, and leadership and guidance of others.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units	

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Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Implement continuous improvement systems and processes	1.1. Implement ***systems*** to ensure that individuals and teams are actively encouraged and supported to ***participate in decision making processes***, assume responsibility and exercise initiative 1.2. Communicate the organisation's ***continuous improvement processes*** to individuals and teams, and obtain feedback 1.3. Ensure effective ***mentoring and coaching*** allows individuals and teams to implement the organisation's continuous improvement processes
2. Monitor and review performance	2.1. Use the organisation's systems and ***technology*** to monitor and review progress and to identify ways in which planning and operations could be improved 2.2. Improve ***customer service*** through continuous improvement techniques and processes

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ELEMENT	PERFORMANCE CRITERIA
	2.3. Formulate and communicate recommendations for adjustments to those who have a role in their development and implementation
3. Provide opportunities for further improvement	3.1. Implement ***processes to ensure that team members are informed of savings and productivity/service improvements*** in achieving the business plan 3.2. Document work performance to aid the identification of further opportunities for improvement 3.3. Manage records, reports and recommendations for improvement within the organisation's systems and processes

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills

• communication skills to:
  • coach and mentor team members
  • gain the commitment of individuals and teams to continuously improve
• innovation skills to design better ways of performing work.

Required knowledge

• principles and techniques associated with:
  • benchmarking
  • best practice
  • change management
  • continuous improvement systems and processes
  • quality systems.

Evidence Guide

EVIDENCE GUIDE
The Evidence Guide provides advice on assessment and must be read in conjunction with the

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EVIDENCE GUIDE	
performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Evidence of the following is essential: • taking active steps to implement, monitor and adjust plans, processes and procedures to improve performance • supporting others to implement the continuous improvement system/processes, and to identify and report opportunities for further improvement • knowledge of principles and techniques associated with continuous improvement systems and processes.
Context of and specific resources for assessment	Assessment must ensure: • access to appropriate documentation and resources normally used in the workplace.
Method of assessment	A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate for this unit: • assessment of written reports • direct questioning combined with review of portfolios of evidence and third party workplace reports of on-the-job performance by the candidate • observation of presentations • oral or written questioning to assess knowledge of principles and techniques associated with change management • review of how the organisation's continuous improvement processeswascommunicated to individuals and teams • review of documentation of work performance.
Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended, for example: • other units from the Certificate IV in Frontline Management.

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Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Systems may refer to:	• forums, meetings • newsletters and reports • organisational policies and procedures • web-based communication devices
Participation in decision making processes may include:	• feedback in relation to outcomes of the consultative process • processes which ensures all employees have the opportunity to contribute to organisational issues
Continuous improvement processes may include:	• cyclical audits and reviews of workplace, team and individual performance • evaluations and monitoring of effectiveness • implementation of quality systems, such as International Standardization for Organization (ISO) • modifications and improvements to systems, processes, services and products • policies and procedures which allow the organisation to systematically review and improve the quality of its products, services and procedures • seeking and considering feedback from a range of stakeholders
Mentoring and coaching may refer to:	• providing assistance with problem-solving • providing feedback, support and encouragement • teaching another member of the team, usually focusing on a specific work task or skill
Technology may include:	• computerised systems and software such as databases, project management and word processing • telecommunications devices • any other technology used to carry out work roles and responsibilities

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RANGE STATEMENT	
Customer service may be:	• internal or external • to existing, new or potential clients
Processes to ensure that team members are informed of savings and productivity/service improvements may refer to:	• email/intranet, newsletters or other communication devices • newsletters and bulletins • staff reward mechanisms • team meetings

Unit Sector(s)

Unit sector	

Competency field

Competency field	Management and Leadership - Management

Co-requisite units

Co-requisite units		

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BSBWOR401A Establish effective workplace relationships

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit describes the performance outcomes, skills and knowledge required to collect, analyse and communicate information and to use that information to develop and maintain effective working relationships and networks, with particular regard to communication and representation. No licensing, legislative, regulatory or certification requirements apply to this unit at the time of endorsement.

Application of the Unit

Application of the unit	Frontline managers play an important role in developing and maintaining positive relationships in internal and external environments so that customers, suppliers and the organisation achieve planned outputs and outcomes. They play a prominent part in motivating, mentoring, coaching and developing team cohesion through providing leadership for the team and forming the bridge between the management of the organisation and team members. At this level, work will normally be carried out within routine and non routine methods and procedures, which require planning and evaluation, and leadership and guidance of others.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Collect, analyse and communicate information and ideas	1.1. Collect relevant ***information*** from appropriate sources and analyse and share with the work team to improve work performance 1.2. Communicate ideas and information in a manner which is appropriate and sensitive to the cultural and social diversity of the audience and any specific needs 1.3. Implement ***consultation processes*** to encourage employees to contribute to issues related to their work, and promptly relay feedback to the work team in regard to outcomes 1.4. Seek and value contributions from internal and external sources in developing and refining new ideas and approaches

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ELEMENT	PERFORMANCE CRITERIA
	1.5. Implement ***processes*** to ensure that issues raised are resolved promptly or referred to ***relevant personnel*** as required
2. Develop trust and confidence	2.1. Treat all internal and external contacts with integrity, respect and empathy 2.2. Use the ***organisation's social***, ***ethical and business standards*** to develop and maintain effective relationships 2.3. Gain and maintain the trust and confidence of ***colleagues***, ***customers and suppliers*** through competent performance 2.4. Adjust interpersonal styles and methods to meet organisation's social and cultural environment 2.5. Encourage other members of the work team to follow examples set, according to ***organisation's policies and procedures***
3. Develop and maintain networks and relationships	3.1. Use ***networks*** to identify and build relationships 3.2. Use networks and other work relationships to provide identifiable benefits for the team and organisation
4. Manage difficulties into positive outcomes	4.1. Identify and analyse difficulties, and take action to rectify the situation within the requirements of the organisation and relevant legislation 4.2. Guide and support colleagues to resolve work difficulties 4.3. Regularly review and improve ***workplace outcomes*** in consultation with relevant personnel 4.4. Manage ***poor work performance*** within the organisation's processes 4.5. Manage conflict constructively within the organisation's processes

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE This section describes the skills and knowledge required for this unit.
Required skills
• coaching and mentoring skills to provide support to colleagues

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REQUIRED SKILLS AND KNOWLEDGE

• literacy skills to research, analyse, interpret and report information
• relationship management and communication skills to:
  • deal with people openly and fairly
  • forge effective relationships with internal and/or external people, and to develop and maintain these networks
  • gain the trust and confidence of colleagues
  • respond to unexpected demands from a range of people
  • use supportive and consultative processes effectively.

Required knowledge

• relevant legislation from all levels of government that affects business operation, especially in regard to occupational health and safety (OHS), and environmental issues, equal opportunity, industrial relations and anti-discrimination
• theory associated with managing work relationships to achieve planned outcomes:
  • developing trust and confidence
  • maintaining consistent behaviour in work relationships
  • understanding the cultural and social environment
  • identifying and assessing interpersonal styles
  • establishing, building and maintaining networks
  • identifying and resolving problems
  • resolving conflict
  • managing poor work performance
  • monitoring, analysing and introducing ways to improve work relationships.

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Evidence of the following is essential: • range of methods and techniques for communicating information and ideas to a range of stakeholders • range of methods and techniques for developing positive work relationships that build trust and

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EVIDENCE GUIDE	
	confidence in the team • accessing and analysing information to achieve planned outcomes • techniques for resolving problems and conflicts and dealing with poor performance • knowledge of the theory associated with managing work relationships to achieve planned outcomes.
Context of and specific resources for assessment	Assessment must ensure: • access to appropriate documentation and resources normally used in the workplace.
Method of assessment	A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate for this unit: • demonstration of techniques in managing poor performance and communicating effectively • direct questioning combined with review of portfolios of evidence and third party workplace reports of on-the-job performance by the candidate • observation of performance in role plays • observation of presentations • oral or written questioning to assess knowledge of relevant legislation • review of consultation processesimplemented to encourage employees to contribute to issues related to their work • review of documentation outlining reviewing ofworkplace outcomes.
Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended, for example: • other units from the Certificate IV in Frontline Management.

Range Statement

RANGE STATEMENT
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised

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RANGE STATEMENT	
wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Information may include:	• data appropriate to work roles and organisational policies that is shared and retrieved in writing or verbally, electronically or manually such as: • archived, filed and historical background data • individual and team performance data • marketing and customer related data • planning and organisational documents including the outcomes of continuous improvement and quality assurance • policies and procedures
Consultation processes may include:	• feedback to the work team and relevant personnel in relation to outcomes of the consultation process • opportunities for all employees to contribute to ideas and information about organisational issues
Processes to ensure that issues raised are resolved promptly or referred may include:	• conducting informal meetings • coordinating surveys or questionnaires • distributing newsletters or reports • exchanging informal dialogue with relevant personnel • participating in planned organisational activities
Relevant personnel may include:	• managers • OHS committee and other people with specialist responsibilities • other employees • supervisors • union representatives/groups
Organisation's social, ***ethical and business standards*** may refer to:	• implied standards such as honesty and respect relative to the organisational culture and generally accepted within the wider community • rewards and recognition for high performing staff

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RANGE STATEMENT	

	• standards expressed in legislation and regulations such as anti-discrimination legislation
	• written standards such as those expressed in:
	  • code of workplace conduct/behaviour
	  • dress code
	  • policies
	  • statement of workplace values
	  • vision and mission statements

Colleagues, customers and suppliers may include:	• both internal and external contacts • employees at the same level and more senior managers • people from a wide variety of social, cultural and ethnic backgrounds • team members
Organisation's policies and procedures may refer to:	• Materials Safety Data Sheets • organisational tasks and activities undertaken to meet performance outcomes • sets of accepted actions approved by the organisation • Standard Operating Procedures
Networks may be:	• established structures or unstructured arrangements and may include business or professional associations • informal or formal and with individuals or groups • internal and/or external
Workplace outcomes may include:	• OHS processes and procedures • performance of the work team
Poor work performance may refer to:	• individual team members • organisation as a whole • self • whole work team

Unit Sector(s)

Unit sector	

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Competency field

Competency field	Industry Capability - Workplace Effectiveness

Co-requisite units

Co-requisite units		

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BSBWOR402A Promote team effectiveness

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit describes the performance outcomes, skills and knowledge required to promote teamwork. It involves developing team plans to meet expected outcomes, leading the work team, and proactively working with the management of the organisation. No licensing, legislative, regulatory or certification requirements apply to this unit at the time of endorsement.

Application of the Unit

Application of the unit	Frontline managers have an important leadership role in the development of efficient and effective work teams. They play a prominent part in team planning, supervising the performance of the team and developing team cohesion. They provide leadership for the team and bridge the gap between the management of the organisation and the team members. As such they must 'manage up' as well as manage their team/s.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

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Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Plan to achieve team outcomes	1.1. Identify, establish and document ***team purpose***, ***roles***, ***responsibilities***, ***goals***, ***plans and objectives*** in ***consultation*** with team members 1.2. Support team members in meeting expected outcomes
2. Develop team cohesion	2.1. Provide opportunities for input of team members into planning, decision making and operational aspects of work team 2.2. Encourage and support team members to take ***responsibility for own work*** and to assist each other in undertaking required roles and responsibilities 2.3. Provide ***feedback*** to team members to encourage, value and reward individual and team efforts and contributions 2.4. Recognise and address issues, concerns and problems identified by team members or refer to ***relevant persons*** as required

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ELEMENT	PERFORMANCE CRITERIA
3. Participate in and facilitate work team	3.1. Actively encourage team members to participate in and take responsibility for team activities and communication processes 3.2. Give the team support to identify and resolve problems which impede its performance 3.3. Ensure own contribution to work team serves as a role model for others and enhances the organisation's image within the work team, the organisation and with clients/customers
4. Liaise with management	4.1. Maintain open ***communication*** with ***line manager***/***management*** at all times 4.2. Communicate information from line manager/management to the team 4.3. Communicate unresolved issues, concerns and problems raised by the team/team members to line manager/management and ensure follow-up action is taken 4.4. Communicate unresolved issues, concerns and problems related to the team/team members raised by line managers/management to the team and ensure follow-up to action is taken

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

- communication skills to:
  - boost team morale
  - deal with team conflict
  - deliver messages from management
  - facilitate discussion
  - mentor and coach
- leadership skills
- planning and organising skills.

Required knowledge

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REQUIRED SKILLS AND KNOWLEDGE

• organisational goals, objectives and plans
• organisational policy and procedures framework
• organisational structure, including organisational chart
• principles and techniques associated with:
  • delegation and work allocation
  • goal setting
  • group dynamics and processes
  • individual behaviour and difference
  • leadership
  • motivation
  • negotiation
  • planning.

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Evidence of the following is essential: • teamwork plan with details of how it was generated and how it will be monitored so that team goals can be met • techniques in communicating information, dealing with team conflict and resolving issues • knowledge of organisational goals, objectives and plans.
Context of and specific resources for assessment	Assessment must ensure: • access to appropriate documentation and resources normally used in the workplace.
Method of assessment	A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate for this unit: • analysis of responses to case studies and scenarios

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EVIDENCE GUIDE	
	• direct questioning combined with review of portfolios of evidence and third party workplace reports of on-the-job performance by the candidate • observation of demonstrated techniques in working with team dynamics • observation of performance in role plays • oral or written questioning to assess knowledge of principles and techniques associated with group dynamics and processes • evaluation of opportunities provided for input of team members into planning, decision making and operational aspects of work team • review of feedback provided to team members • review of teamwork plan.
Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended, for example: • other units from the Certificate IV in Frontline Management.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Team purpose, ***roles***, ***responsibilities***, ***goals***, ***plans and objectives*** may include:	• action plans, business plans and operational plans linked to strategic plans • expected outcomes and outputs • goals for individuals and the work team • individual and team performance plans and key performance indicators • occupational health and safety (OHS) responsibilities
Consultation may include:	• attending meetings, interviews, brainstorming sessions

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RANGE STATEMENT	
	• using email/intranet communications, newsletters or other processes and devices which ensure that all employees have the opportunity to contribute to team and individual effectiveness • using mechanisms to provide feedback to the work team in relation to consultation outcomes
Responsibility for own work may involve:	• individual and joint actions • individuals and teams
Feedback may refer to:	• formal/informal gatherings between team members where there is communication on work related matters • informal communication of ideas and thoughts on specific tasks, outcomes, decisions, issues or behaviours
Relevant persons may include:	• colleagues • direct superior or other management representatives • OHS committees and other people with specialist responsibilities
Communication may include:	• face-to-face • formal/informal interaction • verbal, written or electronic communication
Line manager*/*management may refer to:	• direct superior or other management representatives

Unit Sector(s)

Unit sector	

Competency field

Competency field	Management and Leadership - Management

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Co-requisite units

Co-requisite units		

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BSBWOR404B Develop work priorities

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit describes the performance outcomes, skills and knowledge required to plan one's own work schedules, to monitor and to obtain feedback on work performance and development. It also addresses the requirement to take responsibility for one's own career planning and professional development. No licensing, legislative, regulatory or certification requirements apply to this unit at the time of endorsement.

Application of the Unit

Application of the unit	This unit applies to individuals who are required to design their own work schedules and work plans, and to establish priorities for their work. They will typically hold some responsibilities for the work of others and have some autonomy in relation to their own role.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

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Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Plan and complete own work schedule	1.1. Prepare ***Workgroup*** plans which reflect consideration of resources, client needs and workgroup targets 1.2. Analyse and incorporate ***Work objectives*** and priorities into personal schedules and responsibilities 1.3. Identify ***Factors affecting the achievement of work objectives*** and establish contingencies and incorporate them into work plans 1.4. Efficiently and effectively use ***Business technology*** to manage and monitor planning completion and scheduling of tasks
2. Monitor own work performance	2.1. Identify and analysed personal performance through self-assessment and feedback from others on the achievement of work objectives 2.2. Seek and evaluate ***Feedback on performance*** from colleagues and clients in the context of individual and group requirements 2.3. Routinely identify and report on variations in the quality of service and performance in accordance with organisational requirements
3. Coordinate	3.1. Assess personal knowledge and skills against

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ELEMENT	PERFORMANCE CRITERIA
professional development	organisational benchmarks to determine development needs and priorities 3.2. Research and identify sources and plan for opportunities for improvement in consultation with colleagues 3.3. Use ***Feedback*** to identify and develop ways to improve competence within available opportunities 3.4. Identify, access and complete ***professional development activities*** to assist career development 3.5. Store and maintain records and documents relating to achievements and assessments in accordance with organisational requirements

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

- learning skills to recognise and develop new and necessary skills and knowledge
- literacy skills to understand the organisation's policies, procedures and communications, to write personal work plans and professional development plans, and to request and receive feedback about performance
- organising skills to prioritise, manage time and meet deadlines
- problem solving skills to develop contingency plans

Required knowledge

- knowledge of relevant business technology applications to schedule tasks and plan work
- knowledge of techniques to prepare personal plans and establish priorities
- methods to identify and prioritise personal learning needs
- understanding of a range of professional development options
- understanding of methods to elicit, analyse and interpret feedback
- understanding of methods to evaluate own performance

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Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Evidence of the following is essential: • preparing and communicating own work plan • scheduling work objectives and tasks to support the achievement of goals • seeking and acting on feedback from clients and colleagues • reviewing own work performance against achievements through self-assessment • accessing learning opportunities to extend own personal work competencies • using business technology to monitor self development.
Context of and specific resources for assessment	Assessment must ensure: • the learner and trainer should have access to appropriate documentation and resources normally used in the workplace
Method of assessment	A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate for this unit: • direct questioning combined with review of portfolios of evidence and third party workplace reports of on-the-job performance by the candidate • observation of performance in role plays • observation of presentations • review of work and professional development plans.
Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended, for example: • Other units from the Certificate IV in Frontline Management.

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Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Workgroup plans may include:	• budgetary plans • production plans • reporting plans • sales plans • team and individual learning goals • team participation • work schedules
Work objectives may include:	• budgetary targets • production targets • reporting deadlines • sales targets • team and individual learning goals • team participation
Factors affecting the achievement of work objectives may include:	• budget constraints • competing work demands • environmental factors such as time, weather, etc • personnel • resource and materials availability • technology/equipment breakdowns • unforeseen incidents
Business technology may include:	• computer applications • computers • email and internet/intranet/extranet • facsimile machines • modems • personal schedules • photocopiers • printers • scanners
Feedback on performance may include:	• formal/informal performance appraisals • obtaining comments from clients • obtaining comments from supervisors and

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RANGE STATEMENT	
	colleagues • personal, reflective behaviour strategies • routine organisational methods for monitoring service delivery
Professional development activities may include:	• career planning/development • coaching, mentoring and/or supervision • formal/informal learning programs • internal/external training provision • performance appraisals • personal study • Recognition of Prior Learning • work experience/exchange/opportunities • workplace skills assessment

Unit Sector(s)

Unit sector	

ELEMENT	PERFORMANCE CRITERIA

Competency field

Competency field	Management and Leadership - Management

Co-requisite units

Co-requisite units		

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BSBCUS501C Manage quality customer service

Modification History

Release	Comments
Release 1	New release of this Qualification released with *version 6 of BSB07* Business *Services Training Package*. Revised unit. Required skills updated to focus on learning and development practices and compliance with policy and procedures.

Unit Descriptor

This unit describes the performance outcomes, skills and knowledge required to develop strategies to manage organisational systems that ensure products and services are delivered and maintained to standards agreed by the organisation.

Operators may have staff involved in delivering customer service and are responsible for the quality of their work. In many instances the work will occur within the organisation's policies and procedures framework. At this level, the exercise of considerable discretion and judgement, using a range of problem solving and decision making strategies, will be required.

Application of the Unit

Many managers are involved in ensuring that products and services are delivered and maintained to standards agreed by the organisation.

Licensing/Regulatory Information

No licensing, legislative, regulatory or certification requirements apply to this unit at the time of endorsement.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

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Elements and Performance Criteria Pre-Content

Element	Performance Criteria
Elements describe the essential outcomes of a unit of competency.	*Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.*

Elements and Performance Criteria

1. Plan to meet internal and external customer requirements	1.1 Investigate, identify, assess, and include the needs of ***customers*** in planning processes 1.2 Ensure plans achieve the ***quality***, time and cost specifications agreed with customers
2. Ensure delivery of quality products and services	2.1 Deliver ***products and services*** to customer specifications within organisation's business plan 2.2 Monitor team performance to consistently meet the organisation's quality and delivery standards 2.3 Assist colleagues to overcome difficulty in meeting customer service standards
3. Monitor, adjust and review customer service	3.1 Develop and use ***strategies*** to monitor progress in achieving product and/or service targets and standards 3.2 Develop and use strategies to obtain customer feedback to improve the provision of products and services 3.3. Develop, procure and use ***resources*** effectively to provide quality products and services to customers 3.4 Make decisions to overcome problems and to adapt customer services, products and service delivery in consultation with appropriate individuals and groups 3.5 Manage records, reports and recommendations within the organisation's systems and processes

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

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Required skills

- analytical skills to identify trends and positions of products and services
- communication skills to:
  - coach and mentor staff and colleagues
  - monitor and advise on customer service strategies
- literacy skills to:
  - edit and proofread texts to ensure clarity of meaning and accuracy of grammar and punctuation
  - prepare general information and papers according to target audience
  - read and understand a variety of texts
- problem-solving skills to:
  - deal with customer enquiries or complaints
  - deal with complex and non-routine difficulties
- technology skills to select and use technology appropriate to a task
- self-management skills to:
  - comply with policies and procedures
  - consistently evaluate and monitor own performance
  - seek learning opportunities.

Required knowledge

- key provisions of relevant legislation from all levels of government that may affect aspects of business operations, such as:
  - anti-discrimination legislation
  - Australian consumer law
  - ethical principles
  - codes of practice
  - privacy laws
  - financial legislation
  - occupational health and safety (OHS)
- organisational policy and procedures for customer service including handling customer complaints
- service standards and best practice models
- public relations and product promotion
- techniques for dealing with customers, including customers with specific needs
- techniques for solving complaints including the principles and techniques involved in the management and organisation of:
  - customer behaviour
  - customer needs research
  - customer relations
  - ongoing product and/or service quality

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- problem identification and resolution
- quality customer service delivery
- record keeping and management methods
- strategies for monitoring, managing and introducing ways to improve customer service relationships
- strategies to obtain customer feedback.

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Evidence of the following is essential: • plans, policies or procedures for delivering quality customer service • demonstrated techniques in solving complex customer complaints and system problems that lead to poor customer service • knowledge of techniques for solving complaints.
Context of and specific resources for assessment	Assessment must ensure: • access to appropriate documentation and resources normally used in the workplace.
Method of assessment	A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate for this unit: • assessment of written reports • demonstration of techniques • direct questioning combined with review of portfolios of evidence and third party workplace reports of on-the-job performance by the candidate • observation of performance in role plays • evaluation of leadership, supervision, coaching and mentoring used to assist colleagues to overcome difficulty in meeting customer service standards • review of strategies developed and used to monitor progress in achieving product and/or service targets and standards • review of records, reports and recommendations about managing customer service.

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Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Customers may be:	• Board members • clients, purchasers of services • co-workers, peers and fellow frontline managers • members of the general public who make contact with the organisation, such as prospective purchasers of services • potential funding bodies • supervisors • suppliers of goods and services and contractors providing goods and services.
Quality may refer to:	• characteristics of a product, system, service or process that meet the requirements of customers and interested parties.
Products and services may include:	• either products or services • goods • ideas • infrastructure • private or public sets of benefits.
Strategies may refer to:	• databases and other controls to record and compare data over time • electronic feedback mechanisms using intranet, internet and email • feedback forms and other devices to enable communication from customers • long-term or short-term plans for monitoring achievement and evaluating effectiveness • policies and procedures • questionnaires, survey and interviews • training and development activities.

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Resources may include:	• buildings/facilities • equipment • finance • information • people • power/energy • technology • time.

Unit Sector(s)

Stakeholder Relations – Customer Service

Custom Content Section

Not applicable.

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BSBINM501A Manage an information or knowledge management system

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit describes the performance outcomes, skills and knowledge required to organise learning to use an information or knowledge management system and to manage the use of the system. No licensing, legislative, regulatory or certification requirements apply to this unit at the time of endorsement.

Application of the Unit

Application of the unit	This unit applies to managers who have responsibility for seeing that key information and corporate knowledge are retained, accessible to others and improve business outcomes. The unit does not address the requirement to select the technical system (software or hardware), which is seen as the role of an information technology specialist, although in some smaller organisations this may be a part of the manager's role.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

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Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Organise learning to use information or knowledge management system	1.1. Identify learning needs of ***relevant personnel*** and ***stakeholders*** for input into, and use of, ***an information or knowledge management system*** 1.2. Identify and secure human, financial and physical resources required for ***learning activities*** to use an information or knowledge management system 1.3. Organise and facilitate learning activities 1.4. Promote and support use of the system throughout the organisation 1.5. Monitor and document effectiveness of learning activities
2. Manage use of information or knowledge management system	2.1. Ensure implementation of ***policies and procedures for the information or knowledge management system*** are monitored for compliance, effectiveness and efficiency 2.2. Address implementation issues and problems as they arise

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ELEMENT	PERFORMANCE CRITERIA
	2.3. Monitor integration and alignment with data and information systems 2.4. Collect information on achievement of ***performance measures*** 2.5. Manage contingencies such as system failure or technical difficulties by accessing technical specialist help as required
3. Review use of information or knowledge management system	3.1. Analyse effectiveness of system and report on strengths and limitations of the system 3.2. Review business and operational plan and determine how effectively the system is contributing to intended outcomes 3.3. Make recommendations for improvement to system, policy or work practices

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

- analytical and problem-solving skills to ensure the system is working in accordance with organisational expectations and to deal with contingencies
- technology skills to work with and manage the use of the information or knowledge management system.

Required knowledge

- legislation, codes of practice and national standards, for example:
  - privacy and confidentiality legislation
  - freedom of information legislation
  - AS 5037:2005 Knowledge management - A guide
- organisational policies and procedures, for example:
  - records management
  - information management
  - customer service
  - commercial confidentiality
- organisational operations, and existing data and information systems.

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Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Evidence of the following is essential: • analysis of the strengths and weaknesses of information or knowledge management system/s and evaluation of suitability for a particular work or organisational context • knowledge of relevant legislation, codes of practice and national standards.
Context of and specific resources for assessment	Assessment must ensure: • access to system • access to system user feedback.
Method of assessment	A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate for this unit: • assessment of written reports reviewing and evaluating information or knowledge management systems • direct questioning combined with review of portfolios of evidence and third party workplace reports of on-the-job performance by the candidate • observation of presentations • oral or written questioning to assess knowledge of relevant organisational policies and procedures • review of identified learning needs personnel and stakeholders regarding the information or knowledge management system • evaluation of monitoring and documentation about the effectiveness of learning activities • analysis documentation reporting on the strengths and limitations of the system • review of recommendations made for improvements to the system, policy or work practices.
Guidance information for	Holistic assessment with other units relevant to the

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EVIDENCE GUIDE	
assessment	industry sector, workplace and job role is recommended, for example: • other units from the Diploma of Management.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Relevant personnel include:	• managers, leaders, supervisors and coordinators • owners • staff, team members and colleagues
Stakeholders include:	• clients and customers • employee representatives • funding bodies • industry, professional and trade associations • regulatory bodies and authorities • sponsors • tenderers, suppliers and contractors
Information or knowledge management is defined as:	• equipment, strategies, methods, activities and techniques used formally and informally by individuals and the organisation to identify, collect, organise, store, retrieve, analyse, share and draw on information and knowledge valuable to the work of the organisation
An information or knowledge management system:	• comprises policies, protocols, procedures and practices to manage information or knowledge within the organisation and among relevant stakeholders
Learning activities include:	• coaching and mentoring programs • help desks • information sessions, briefings, workshops and training programs • paper-based or electronic (including intranet)

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RANGE STATEMENT	
	learning opportunities • use of expert workers such as coaches and mentors to help other personnel use the system
Policies and procedures for the information or knowledge management system cover:	• complying with legislative requirements (such as privacy, confidentiality and defamation requirements) and other policies and procedures • content guidelines • ensuring accuracy and relevance of knowledge input into the system • mechanisms, formats and styles of input to system, including appropriate alternative formats for people with a disability • permissions for input • removing out-of-date, inaccurate and content that is no longer relevant • selecting, maintaining and disposing of knowledge in the system • sharing knowledge in the system
Performance measures include:	• key performance indicators • other systems and measures to enable assessment of how, when, where and why outcomes are being achieved • performance objectives • performance standards (including codes of conduct) • qualitative or quantitative mechanisms to measure individual performance

Unit Sector(s)

Unit sector	

Competency field

Competency field	Management and Leadership - Management

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Co-requisite units

Co-requisite units		

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BSBINN502A Build and sustain an innovative work environment

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit describes the performance outcomes, skills and knowledge required to create an environment that enables and supports the application of innovative practice. No licensing, legislative, regulatory or certification requirements apply to this unit at the time of endorsement.

Application of the Unit

Application of the unit	This unit applies to individuals working in leadership or management roles in any industry or community context. The individual could be employed by the organisation, but may also be an external contractor, the leader of a cross organisation team or of a self formed team of individuals. The work group could be permanent or temporary in nature. The unit focuses on the skills and knowledge required to develop and implement a holistic approach to the integration of innovation across all areas of work practice. It also acknowledges the importance of wider contextual evaluation for potential innovations to ensure their value and benefit.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

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Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Lead innovation by example	1.1. Make innovation an integral part of ***leadership and management activities*** 1.2. Demonstrate positive reception of ideas from others and provide constructive advice 1.3. Establish and maintain relationships based on mutual respect and trust 1.4. Take considered ***risks*** to open up opportunities for innovation 1.5. Regularly evaluate own approaches for consistency with the wider organisational or project context
2. Establish work practices that support innovation	2.1. Consult on and establish ***working conditions*** that reflect and encourage innovative practice 2.2. Introduce and maintain ***workplace procedures*** that foster innovation and allow for rigorous ***evaluation of innovative ideas*** 2.3. Facilitate and participate in ***collaborative work arrangements*** to foster innovation

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ELEMENT	PERFORMANCE CRITERIA
	2.4. Build and lead teams to work in ***ways that maximise opportunities for innovation***
3. Promote innovation	3.1. Acknowledge suggestions, improvements and innovations from all colleagues 3.2. Find appropriate ***ways of celebrating and promoting innovation*** 3.3. Promote and reinforce the value of innovation according to the vision and objectives of the organisation or project 3.4. Promote and support the evaluation of innovative ideas within the wider organisational or project context
4. Create a physical environment which supports innovation	4.1. Evaluate the ***impact of the physical environment*** in relation to innovation 4.2. Collaborate with colleagues about ideas for enhancing the physical work environment before taking action 4.3. Consider potential for supporting innovation when selecting physical resources and equipment 4.4. Design, fit-out and decorate workspaces to encourage creative mindsets, collaborative working and the development of positive workplace relationships
5. Provide learning opportunities	5.1. Pro-actively share relevant information, knowledge and skills with colleagues 5.2. Provide or encourage ***formal and informal learning opportunities*** to help develop the skills needed for innovation 5.3. Create opportunities in which individuals can learn from the experience of others

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
• communication, consultation and negotiation skills to model and lead, open and collaborative relationships

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REQUIRED SKILLS AND KNOWLEDGE
• comprehension skills to interpret and develop information that may deal with complex ideas and relate to issues both within and outside a given workplace context • planning and organisational skills to implement wide-ranging practical processes and procedures that support innovation • problem-solving skills to assess and respond to challenges and risks around innovation at an operational management level • self-management and learning skills to evaluate and enhance personal effectiveness, and to promote a culture of ongoing learning and development.
Required knowledge
• benefits of providing coaching and learning opportunities in relation to innovation • concept of innovation, what it is and what it means for different people either working independently or within an organisation • context for innovation in the relevant workplace context including core business values, overall objectives, broader environmental context and the need to ensure the value and benefit of innovative ideas and projects • different ways of rewarding performance • factors and tools that can motivate individuals to use creative thinking and apply innovative work practices • legislative framework that impacts on operations in the relevant workplace context • management principles and leadership styles, including the impact of different approaches on innovation • typical challenges and barriers to innovation within teams and organisations, and ways of overcoming these • ways in which workplace climate can affect individual attitudes and performance.

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Evidence of the following is essential: • establishment of procedures and practices (for a project or a workplace) which support and foster innovative work practice and include sound

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EVIDENCE GUIDE	
	evaluation processes • modelling of behaviour that supports innovative work practice • knowledge and understanding of the role of leaders and managers in encouraging innovation, and the issues and challenges associated with building and sustaining an innovative work environment.
Context of and specific resources for assessment	Assessment must ensure: • involvement of a team for which the candidate provides leadership and guidance.
Method of assessment	A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate for this unit: • direct questioning combined with review of portfolios of evidence and third party workplace reports of on-the-job performance by the candidate • evaluation of outcomes and processes from activities managed by the candidate, particularly in relation to how innovation and innovative practice was encouraged and supported • oral or written questioning to assess knowledge of ways that innovation can be fostered and the typical challenges and barriers to innovation.
Guidance information for assessment	Innovation does not occur in isolation. Holistic assessment with other units relevant to the industry sector, workplace and job role is highly recommended.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Leadership and management activities may include:	• people management practices • planning processes

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RANGE STATEMENT	
	• regular management meetings • review processes
Risks may include:	• budgetary issues • challenging changes in relationships, work practices and general workplace climate • unforseen impacts of innovative ideas
Working conditions may include:	• family-friendly leave entitlements • flexible working hours • social leave • study leave • time provided for coming up with ideas
Workplace procedures may relate to:	• briefing processes • client relations • performance management • project management • staff meetings • training
Evaluation of innovative ideas may relate to:	• analysing consistency with overall goals, values or vision • assessing resource requirements and practicalities • assessing the potential to find 'champions' or supporters • evaluating the external factors that may impact on the idea • exploring the implications of ideas that may stretch or change existing ways of doing things
Collaborative work arrangements might be:	• cross section • vertical teams • within a section • working with supplier organisations or partner organisations
Ways that maximise opportunities for innovation may relate to:	• collaborating • collecting data • creative thinking • future scanning • getting feedback • making suggestions • networking
Ways of celebrating and	• congratulating the project team

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RANGE STATEMENT	
promoting innovation may include:	• ensuring management acknowledgment • providing a newsletter story about the idea • using the idea to help foster other ideas • well-planned group incentive schemes
Impact of the physical environment may relate to:	• eating areas • extent to which design or style links with declared philosophies or objectives • external areas • general ambience of the work environment • location of different people • presence and ambience of relaxation areas • style of dÃ©cor • use of creative messages or images in the workplace • workspace design and dÃ©cor • workstation arrangements and opportunities for interaction
Formal and informal learning opportunities may include:	• coaching • conferences • formal training courses/programs • information seminars • job rotation • mentoring • online learning

Unit Sector(s)

Unit sector	

Competency field

Competency field	Creativity and Innovation - Innovation

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Co-requisite units

Co-requisite units		

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BSBLED501A Develop a workplace learning environment

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit describes the performance outcomes, skills and knowledge required to encourage and support the development of a learning environment in which work and learning come together. Particular emphasis is on the development of strategies to facilitate and promote learning, and to monitor and improve learning performance. No licensing, legislative, regulatory or certification requirements apply to this unit at the time of endorsement.

Application of the Unit

Application of the unit	This unit applies to managers. All managers have a prominent role in encouraging, supporting and facilitating the development of a learning environment in which work and learning come together. At this level work will normally be carried out within complex and diverse methods and procedures, which require the exercise of considerable discretion and judgement, using a range of problem solving and decision making strategies.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

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Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Create learning opportunities	1.1. Identify potential formal and informal ***learning opportunities*** 1.2. Identify ***learning needs*** of individuals in relation to the needs of the team and/or enterprise, and available learning opportunities 1.3. Develop and implement ***learning plans*** as an integral part of individual and team performance plans 1.4. Develop strategies to ensure that learning plans reflect the ***diversity of needs*** 1.5. Ensure organisational procedures maximise individual and team access to, and participation in, learning opportunities 1.6. Ensure effective liaison occurs with ***training and development specialists*** and contributes to learning opportunities which enhance individual, team and organisational performance

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ELEMENT	PERFORMANCE CRITERIA
2. Facilitate and promote learning	2.1. Develop strategies to ensure that workplace learning opportunities are used and that team members are encouraged to share their skills and knowledge to ***encourage a learning culture*** within the team 2.2. Implement organisational procedures to ensure workplace learning opportunities contribute to the development of appropriate workplace knowledge, skills and attitudes 2.3. Implement policies and procedures to encourage team members to assess their own competencies, and to identify their own learning and development needs 2.4. Share the benefits of learning with others in the team and organisation 2.5. Recognise workplace achievement by timely and appropriate recognition, feedback and rewards
3. Monitor and improve learning effectiveness	3.1. Use strategies to ensure that team and individual learning performance is monitored to determine the type and extent of any additional work-based support required, and any occupational health and safety (OHS) issues 3.2. Use feedback from individuals and teams to identify and introduce improvements in future learning arrangements 3.3. Make adjustments, negotiated with training and development specialists, for improvements to the efficiency and effectiveness of learning 3.4. Use processes to ensure that records and reports of competency are documented and maintained within the organisation's systems and procedures to inform future planning

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
• communication skills to: • deal with people openly and fairly

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REQUIRED SKILLS AND KNOWLEDGE
• encourage colleagues to share their knowledge and skills • gain the trust and confidence of colleagues • use consultation skills effectively • literacy skills to access and use workplace information • planning and organisational skills to facilitate, promote and monitor learning by: • developing learning plans • establishing a workplace which is conducive to learning • evaluating the effectiveness of learning • identifying learning needs • negotiating learning arrangements with training and development specialists • selecting and using work activities to create learning opportunities • using coaching and mentoring to support learning.
Required knowledge
• management of relationships to achieve a learning environment • principles and techniques involved in the management and organisation of: • adult learning • coaching and mentoring • consultation and communication • improvement strategies • leadership • learning environment and learning culture • monitoring and reviewing workplace learning • problem identification and resolution • record keeping and management methods • structured learning • work-based learning.

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	

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EVIDENCE GUIDE	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Evidence of the following is essential: • methods for reviewing performance development needs and techniques for providing feedback on those needs • models for planning professional development • options available for professional development • knowledge of relationship management required to achieve a learning environment.
Context of and specific resources for assessment	Assessment must ensure: • access to appropriate documentation and resources normally used in the workplace.
Method of assessment	A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate for this unit: • analysis of responses to case studies and scenarios • assessment of written reports • direct questioning combined with review of portfolios of evidence and third party workplace reports of on-the-job performance by the candidate • observation of performance in role plays • observation of presentations • oral or written questioning to assess knowledge of the principles and techniques involved in the management and organisation of adult learning • review of the development and implementation of learning plans • evaluation of how workplace achievement is recognised • review of processes used to record and report competency.
Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended, for example: • other units from the Diploma of Management.

Range Statement

RANGE STATEMENT

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RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	

Learning opportunities may include:	• structured learning activities conducted outside and within the workplace such as:
	  • accredited training through an independent organisation such as a state/territory OHS authority
	  • action learning
	  • short courses
	  • training through a Registered Training Organisation (RTO) leading to a nationally recognised Australian Qualifications Framework (AQF) qualification or Statement of Attainment
	  • workshops
	• workplace learning activities, that may also contribute to a recognised credential, such as:
	  • coaching
	  • exchange/rotation
	  • induction
	  • mentoring
	  • shadowing

Learning needs may include:	• developmental learning, for example the learning required to progress through an organisation and take on new tasks and roles • gaps between the competencies held by the employee, and the skills and knowledge required to effectively undertake workplace tasks
Learning plans may include:	• codes of conduct • key performance indicators • negotiated agreement with individual/s • OHS requirements • performance standards • team competencies • team roles and responsibilities • work outputs and processes

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RANGE STATEMENT	
Diversity of needs may include:	• learning needs that relate to social, cultural and other types of workplace diversity, such as the need for varied communication styles and approaches
Training and development specialists may be:	• internal • external
Encourage a learning culture may refer to:	• encouraging learning and sharing skills and knowledge across the work team and the wider organisation to develop competencies of individual team members and the team as a whole

Unit Sector(s)

Unit sector	

Competency field

Competency field	Management and Leadership - Management

Co-requisite units

Co-requisite units		

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BSBMGT502B Manage people performance

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit describes the performance outcomes, skills and knowledge required to manage the performance of staff who report to them directly. Development of key result areas and key performance indicators and standards, coupled with regular and timely coaching and feedback, provide the basis for performance management. No licensing, legislative, regulatory or certification requirements apply to this unit at the time of endorsement.

Application of the Unit

Application of the unit	This unit applies to all managers and team leaders who manage people. It covers work allocation and the methods to review performance, reward excellence and provide feedback where there is a need for improvement. The unit makes the link between performance management and performance development, and reinforces both functions as a key requirement for effective managers. This is a unit that all managers/prospective managers who have responsibility for other employees should strongly consider undertaking.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units	

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Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Allocate work	1.1. Consult relevant groups and individuals on work to be allocated and resources available 1.2. Develop work plans in accordance with operational plans 1.3. Allocate work in a way that is efficient, cost effective and outcome focussed 1.4. Confirm ***performance standards***, ***Code of Conduct*** and work outputs with relevant teams and individuals 1.5. Develop and agree ***performance indicators*** with relevant staff prior to commencement of work 1.6. Conduct ***risk analysis*** in accordance with the organisational risk management plan and legal requirements
2. Assess performance	2.1. Design ***performance management*** and review processes to ensure consistency with organisational

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ELEMENT	PERFORMANCE CRITERIA
	objectives and policies 2.2. Train participants in the performance management and review process 2.3. Conduct performance management in accordance with organisational protocols and time lines 2.4. Monitor and evaluate performance on a continuous basis
3. Provide feedback	3.1. Provide informal feedback to staff on a regular basis 3.2. Advise relevant people where there is poor performance and take necessary actions 3.3. Provide on-the-job coaching when necessary to improve performance and to confirm ***excellence in performance*** 3.4. Document performance in accordance with the organisational performance management system 3.5. Conduct formal structured feedback sessions as necessary and in accordance with organisational policy
4. Manage follow up	4.1. Write and agree performance improvement and development plans in accordance with organisational policies 4.2. Seek assistance from human resources specialists where appropriate 4.3. Reinforce excellence in performance through recognition and continuous feedback 4.4. Monitor and coach individuals with poor performance 4.5. Provide support services where necessary 4.6. Counsel individuals who continue to perform below expectations and implement the disciplinary process if necessary 4.7. ***Terminate*** staff in accordance with legal and organisational requirements where serious misconduct occurs or ongoing poor-performance continues

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

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REQUIRED SKILLS AND KNOWLEDGE This section describes the skills and knowledge required for this unit.
Required skills
• communication skills to articulate expected standards of performance, to provide effective feedback and to coach staff who need development • risk management skills to analyse, identify and develop mitigation strategies for identified risks • planning and organisation skills to ensure a planned and objective approach to the performance management system.
Required knowledge
• relevant legislation from all levels of government that affects business operation, especially in regard to occupational health and safety and environmental issues, equal opportunity, industrial relations and anti-discrimination • relevant awards and certified agreements • performance measurement systems utilised within the organisation • unlawful dismissal rules and due process • staff development options and information.

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Evidence of the following is essential: • documented performance indicators and a critical description and analysis of performance management system from the workplace • techniques in providing feedback and coaching for improvement in performance • knowledge of relevant awards and certified agreements.
Context of and specific resources for assessment	Assessment must ensure: • access to appropriate documentation and resources normally used in the workplace.

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EVIDENCE GUIDE	
Method of assessment	A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate for this unit: • analysis of responses to case studies and scenarios • assessment of written reports • demonstration of techniques in providing feedback and coaching • direct questioning combined with review of portfolios of evidence and third party workplace reports of on-the-job performance by the candidate • review of work plans, performance indicators, risk analysis,performance management and review processes, performance improvement and development plans.
Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended, for example: • other management units.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Performance standards mean:	• level of performance sought from an individual or group which may be expressed either quantitatively or qualitatively
Code of Conduct means:	• agreed (or decreed) set of rules relating to employee behaviour/conduct with other employees or an agreed (or decreed) set of rules relating to employee behaviour/conduct with other employees or customers
Performance indicators mean:	• measures against which performance outcomes are gauged

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RANGE STATEMENT	
Risk analysis means:	• determination of the likelihood of a negative event preventing the organisation meeting its objectives and the likely consequences of such an event on organisational performance
Performance management means:	• in accordance with relevant industrial agreements • process or set of processes for establishing a shared understanding of what an individual or group is to achieve, and managing and developing individuals in a way which increases the probability it will be achieved in both the short- and long-term
Excellence in performance means:	• regularly and consistently exceeding the performance targets established while meeting the organisation's performance standards
Termination means:	• cessation of the contract of employment between an employer and an employee, at the initiative of the employer within relevant industrial agreements

Unit Sector(s)

Unit sector	

Competency field

Competency field	Management and Leadership - Management

Co-requisite units

Co-requisite units		

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BSBMGT515A Manage operational plan

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit describes the performance outcomes, skills and knowledge required to develop and monitor implementation of the operational plan to provide efficient and effective workplace practices within the organisation's productivity and profitability plans. Management at a strategic level requires systems and procedures to be developed and implemented to facilitate the organisation's operational plan. No licensing, legislative, regulatory or certification requirements apply to this unit at the time of endorsement.

Application of the Unit

Application of the unit	This unit applies to people who manage the work of others and operate within the parameters of a broader strategic and/or business plan. The task of the manager at this level is to develop and implement an operational plan to ensure that the objectives and strategies outlined in the strategic and/or business plan are met by work teams. However in some larger organisations operational plans may be developed by a strategic planning unit. At this level work will normally be carried out within complex and diverse methods and procedures, which require the exercise of considerable discretion and judgement, using a range of problem solving and decision making strategies.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Develop operational plan	1.1. Research, analyse and document ***resource requirements*** and develop an operational plan in consultation with ***relevant personnel***, ***colleagues and specialist resource managers*** 1.2. Develop and/or implement ***consultation processes*** as an integral part of the operational planning process 1.3. Ensure details of the operational plan include the development of ***key performance indicators*** to measure organisational performance 1.4. Develop and implement ***contingency plans*** at appropriate stages of operational planning 1.5. Ensure the development and presentation of proposals for resource requirements is supported by a variety of information sources and seek specialist

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ELEMENT	PERFORMANCE CRITERIA
	advice as required 1.6. Obtain approval for plan from relevant parties and ensure understanding among work teams involved
2. Plan and manage resource acquisition	2.1. Develop and implement strategies to ensure that employees are recruited and/or inducted within the organisation's human resources management policies and practices 2.2. Develop and implement strategies to ensure that physical resources and services are acquired in accordance with the ***organisation's policies***, ***practices and procedures***
3. Monitor and review operational performance	3.1. Develop, monitor and review performance systems and processes to assess progress in achieving profit and productivity plans and targets 3.2. Analyse and interpret budget and actual financial information to monitor and review profit and productivity performance 3.3. Identify areas of under performance, recommend solutions, and take prompt action to rectify the situation 3.4. Plan and implement systems to ensure that mentoring and coaching are provided to support individuals and teams to effectively, economically and safely use resources 3.5. Negotiate recommendations for variations to operational plans and gain approval from ***designated persons***/***groups*** 3.6. Develop and implement systems to ensure that procedures and records associated with documenting performance are managed in accordance with organisational requirements

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
• literacy skills to access and use workplace information and to write a succinct and

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REQUIRED SKILLS AND KNOWLEDGE
practical plan • technology skills to use software to produce and monitor the plan against performance indicators • planning and organisational skills • coaching skills to work with people with poor performance • numeracy skills to allocate and manage financial resources.
Required knowledge
• models and methods for operational plans • budgeting processes • alternative approaches to improving resource usage and eliminating resource inefficiencies and waste.

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Evidence of the following is essential: • development of an operational plan with details of how it will be implemented and monitored • knowledge of models and methods for operational plans.
Context of and specific resources for assessment	Assessment must ensure: • access to appropriate documentation and resources normally used in the workplace.
Method of assessment	A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate for this unit: • direct questioning combined with review of portfolios of evidence and third party workplace reports of on-the-job performance by the candidate • oral or written questioning to assess knowledge of budgeting processes • review of operational plan, key performance

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EVIDENCE GUIDE	
	indicators and contingency plans • evaluation of employee recruitment and induction strategies • evaluation of processes implemented to acquire physical resources and services.
Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended, for example: • other units from the Diploma of Management.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Resource requirements may include:	• goods and services to be purchased and ordered • human, physical and financial resources - both current and projected • stock requirements and requisitions
Relevant personnel, colleagues and specialist resource managers may include:	• employees at the same level or more senior managers • managers • occupational health and safety committee/s and other people with specialist responsibilities • supervisors • union or employee representatives
Consultation processes may refer to:	• email/intranet communications, newsletters or other processes and devices which ensure that all employees have the opportunity to contribute to team and individual operational plans • mechanisms used to provide feedback to the work team in relation to outcomes of

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RANGE STATEMENT	
	consultation • meetings, interviews, brainstorming sessions
Operational plans may also be termed:	• action plans • annual plans • management plans • tactical plans
Key performance indicators may refer to:	• measures for monitoring or evaluating the efficiency or effectiveness of a system which may be used to demonstrate accountability and to identify areas for improvements
Contingency plans may include:	• contracting out or outsourcing human resources and other functions or tasks • diversification of outcomes • finding cheaper or lower quality raw materials and consumables • increasing sales or production • recycling and re-using • rental, hire purchase or alternative means of procurement of required materials, equipment and stock • restructuring of organisation to reduce labour costs • risk identification, assessment and management processes • seeking further funding • strategies for reducing costs, wastage, stock or consumables • succession planning
Organisation's policies, ***practices and procedures*** may include:	• organisational culture • organisational guidelines which govern and prescribe operational functions, such as the acquisition and management of human and physical resources • Standard Operating Procedures • undocumented practices in line with organisational operations
Designated persons/***groups*** may include:	• groups designated in workplace policies and procedures • managers or supervisors whose roles and responsibilities include decision making on operations • other stakeholders such as Board members

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RANGE STATEMENT	
	• other work groups or teams whose work will be affected by recommendations for variations

Unit Sector(s)

Unit sector	

Competency field

Competency field	Management and Leadership - Management

Co-requisite units

Co-requisite units		

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BSBMGT516C Facilitate continuous improvement

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit describes the performance outcomes, skills and knowledge required to lead and manage continuous improvement systems and processes. Particular emphasis is on the development of systems and the analysis of information to monitor and adjust performance strategies, and to manage opportunities for further improvements. No licensing, legislative, regulatory or certification requirements apply to this unit at the time of endorsement.

Application of the Unit

Application of the unit	This unit applies to managers who take an active role in managing a continuous improvement process in order to achieve an organisation's objectives. Where managers are closely associated with the creation and delivery of products and services, they play an important part in influencing the ongoing development of the organisation. At this level, work will normally be carried out using complex and diverse methods and procedures which require the exercise of considerable discretion and judgement, using a range of problem-solving and decision-making strategies.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Lead continuous improvement systems and processes	1.1. Develop ***strategies*** to ensure that team members are actively encouraged and supported to participate in decision-making processes, assume responsibility and exercise initiative as appropriate 1.2. Establish ***systems*** to ensure that the organisation's ***continuous improvement processes*** are communicated to ***stakeholders*** 1.3. Ensure that change and improvement processes meet ***sustainability requirements*** 1.4. Develop effective mentoring and coaching processes to ensure that individuals and teams are able to implement and support the organisation's continuous improvement processes 1.5. Ensure that insights and experiences from business

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ELEMENT	PERFORMANCE CRITERIA
	activities are captured and accessible through ***knowledge management systems***
2. Monitor and adjust performance strategies	2.1. Develop strategies to ensure that systems and processes are used to monitor ***operational progress*** and to identify ways in which planning and operations could be improved 2.2. Adjust and communicate strategies to stakeholders according to organisational procedures
3. Manage opportunities for further improvement	3.1. Establish processes to ensure that team members are informed of outcomes of continuous improvement efforts 3.2. Ensure processes include ***recording of work team performance*** to assist in identifying further opportunities for improvement 3.3. Consider areas identified for further improvement when undertaking future planning

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
• communication skills tocommunicate opportunities for improvement • learning skills to coach and mentor staff, using a range of methods to cater for different learning styles • innovation and lateral thinking skills to design better ways for achieving work outcomes • planning skills to establish and monitor systems and process for continuous improvement • teamwork and leadership skills to gain the confidence and trust of others
Required knowledge
• continuous improvement models • knowledge management systems • quality systems • sustainability principles

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Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Evidence of the following is essential: • development and use of a range of strategies and approaches that improve work outcomes or organisational functioning, using continuous improvement models • monitoring performance and customer service.
Context of and specific resources for assessment	Assessment must ensure access to appropriate documentation and resources normally used in the workplace.
Method of assessment	The following assessment methods are appropriate for this unit: • analysis of responses to case studies and scenarios • assessment of reports • direct questioning combined with review of portfolios of evidence and third-party workplace reports of on-the-job performance by the candidate • observationof presentations • oral or written questioning to assess knowledge of quality systems • review of strategies developed to ensure that team members are actively encouraged and supported to participate in decision-making processes, assume responsibility and exercise initiative • evaluation of how customer-service strategies were communicated to stakeholders • review of documentation outlining work team performance.
Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

Range Statement

RANGE STATEMENT
The range statement relates to the unit of competency as a whole. It allows for different

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RANGE STATEMENT	
work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Strategies may refer to:	• clarification of roles and expectations • communication devices and processes, such as intranet and email communication systems, to facilitate input into workplace decisions • long-term or short-term plans that factor in opportunities for team input • mentoring and 'buddy' systems to support team members to participate in decision making • performance plans • reward and recognition programs for high performing staff • training and development activities.
Systems may refer to:	• forums and meetings • newsletters and reports • policies and procedures • electronic communication devices.
Continuous improvement processes may include:	• cyclical audits and reviews of workplace, team and individual performance • evaluations and monitoring of effectiveness • modifications and improvements to systems, processes, services and products • policies and procedures that allow an organisation to systematically review and improve the quality of its products, services and procedures • seeking and considering feedback from a range of stakeholders.
Stakeholders may include:	• business or government contacts • funding bodies • individuals within the work team • internal and external contacts • organisation's clients and customers • professional associations • senior management and board members • unions and employee groups.
Sustainability requirements may	• addressing environmental and resource sustainability initiatives, such as environmental management systems,

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RANGE STATEMENT	
include:	action plans, green office programs, surveys and audits • applying the waste management hierarchy in the workplace • complying with regulations and corporate social responsibility considerations for sustainability to enhance the organisation's standing in business and community environments • determining organisation's most appropriate waste treatment, including waste to landfill, recycling, re-use, recoverable resources and wastewater treatment • implementing ecological footprinting • implementing environmental management systems, e.g. ISO 14001:1996 Environmental management systems life cycle analyses • implementing government initiatives, e.g. Australian government's Greenhouse Challenge Plus • improving resource and energy efficiency • initiating and maintaining appropriate organisational procedures for operational energy consumption • introducing a green office program (a cultural change program) • introducing green purchasing • introducing national and international reporting initiatives, e.g. Global Reporting Initiative • introducing product stewardship • reducing emissions of greenhouse gases • reducing use of non-renewable resources • referencing standards, guidelines and approaches, such as sustainability covenants and compacts or triple bottom line reporting • supporting sustainable supply chain.
Knowledge management systems may include:	• best practice transfer • communities of practice • cross-project learning • expert directories • knowledge brokers' knowledge mapping • knowledge repositories • measuring and reporting intellectual capital • mentoring • performance management • post-project reviews • proximity and architecture

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RANGE STATEMENT	
	• social software • storytelling.
Operational progress may refer to:	• customer service indicators • OHS indicators • productivity gains • success in meeting agreed goals and performance indicators.
Recording of work team performance may include:	• annotated performance plans • quantitative data, such as production figures • recommendations for improvement • records and reports.

Unit Sector(s)

Unit sector	

Competency field

Competency field	Management and leadership - management

Co-requisite units

Co-requisite units		

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BSBWHS501A Ensure a safe workplace

Modification History

Release	Comments
Release 1	This Unit first released with *BSB07 Business Training Package version 7.0*. Replaces and is equivalent to BSBOHS509A Ensure a safe workplace.

Unit Descriptor

This unit describes the performance outcomes, skills and knowledge required to establish, maintain and evaluate the organisation's work health and safety (WHS) policies, procedures and programs in the relevant work area according to WHS legislative requirements.

Application of the Unit

This unit applies to managers working in a range of contexts. It takes a systems approach and addresses compliance with relevant legislative requirements.

Those who have or are likely to have responsibility for WHS as part of their broader management role should undertake this unit.

The unit is relevant for people with obligations under WHS legislation, for example persons conducting a business or undertaking (PCBUs) or their officers (as defined by relevant legislation).

NOTE: The terms Occupational Health and Safety (OHS) and Work Health and Safety (WHS) are equivalent and generally either can be used in the workplace. In jurisdictions where the National Model WHS Legislation has not been implemented RTOs are advised to contextualise the unit of competency by referring to the existing State/Territory OHS legislative requirements.

Licensing/Regulatory Information

No licensing, legislative, regulatory or certification requirements apply to this unit at the time of endorsement.

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Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Element	Performance Criteria
Elements describe the essential outcomes of a unit of competency.	*Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.*

Elements and Performance Criteria

1. Establish and maintain a WHS management system	1.1 Locate, adapt, adopt and communicate WHS policies that clearly define the organisation's commitment to complying with ***WHS legislation***
	1.2 Identify ***duty holders*** and define WHS responsibilities for all workplace personnel according to WHS legislation, policies, procedures and programs
	1.3 Identify and approve financial and human resources required by the WHS management system (WHSMS)
2. Establish and maintain effective and compliant participation arrangements for managing WHS	2.1 Work with workers and their representatives to set up and maintain participation arrangements according to relevant WHS legislation
	2.2 Appropriately resolve issues raised through participation and consultation arrangements according to relevant WHS legislation
	2.3 Promptly provide information about the outcomes of participation and consultation to workers and ensure it is easy for them to access and understand
3. Establish and maintain procedures for effectively identifying	3.1 Develop procedures for ongoing hazard identification, and assessment and ***control of associated risks***
	3.2 Include hazard identification at the planning, design and

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hazards, and assessing and controlling risks	evaluation stages of any change in the workplace to ensure that new hazards are not created by the proposed changes and existing hazards are controlled 3.3 Develop and maintain procedures for selecting and implementing risk controls according to the hierarchy of control and WHS legislative requirements 3.4 Identify inadequacies in existing risk controls according to the hierarchy of control and WHS legislative requirements, and promptly provide resources to enable implementation of new measures 3.5 Identify requirements for expert WHS advice, and request this advice as required
4. Evaluate and maintain a WHS management system	4.1 Develop and provide a WHS induction and training program for all workers as part of the organisation's training program 4.2 Use a system for ***WHS recordkeeping*** to allow identification of patterns of occupational injury and disease in the organisation, and to maintain a record of WHS decisions made, including reasons for the decision 4.3 Measure and evaluate the WHSMS in line with the organisation's quality systems framework 4.4 Develop and implement improvements to the WHSMS to achieve organisational WHS objectives 4.5 Ensure compliance with the WHS legislative framework so that, as a minimum, WHS legal requirements are achieved

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

- analytical and problem solving skills to examine relevant workplace information and data to identify hazards, and to assess and control risks
- communication skills to consult with staff and to promote a safe workplace
- information technology skills to store and retrieve relevant workplace information and data
- literacy skills to adapt and communicate WHS policies that reflect WHS legislative requirements
- problem-solving skills to deal with complex and non-routine difficulties.

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Required knowledge

- hazard identification and risk-management processes
- hierarchy of risk control
- in-house and WHS legislative reporting requirements
- relevant WHS Acts, regulations and codes of practice that apply to the business operation.

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Evidence of the following is essential: • detailed knowledge and application of all relevant WHS Acts, regulations and codes of practice • establishing and maintaining arrangements for managing WHS within the organisation's business systems and practices • identifying requirements for expert WHS advice.
Context of and specific resources for assessment	Assessment must ensure access to: • appropriate documentation and resources normally used in the workplace.
Method of assessment	A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate for this unit: • analysis of responses to case studies and scenarios • assessment of written reports • demonstration of techniques • direct questioning combined with review of portfolios of evidence and third-party workplace reports of on-the-job performance by the candidate • review of WHS policies, information provided on the WHSMS, and information about the outcomes

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	of participation and consultation provided to workers • oral or written questioning to assess knowledge of WHS and WHS legislation • evaluation of WHS induction and training • review of WHS recordkeeping system.
Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

WHS legislation may include:	• applicable commonwealth and state or territory WHS Acts, regulations and codes of practice
	• common law duties to meet general duty of care requirements
	• WHS legislative and regulatory requirements for:
	  • effectively managing hazards
	  • establishing consultation arrangements, including those for health and safety representatives and health and safety committees
	  • providing information and training, including training in safe operating procedures; procedures for workplace hazards; hazard identification, risk assessment and risk control; and emergency and evacuation procedures
	• WHS legislative, regulatory and other requirements for the maintenance and confidentiality of records of occupational injury and disease.

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Duty holders may include:	• as specified in WHS Acts:
	  • officers
	  • PCBUs or their officers
	  • workers
	  • other persons at a workplace.

Control of associated risks may include:	• administrative • as specified in WHS Acts, regulations and codes of practice • counselling/disciplinary processes, such as those associated with alcohol and other drugs • education about alcohol and other drugs work-related issues • engineering • hazard elimination • housekeeping and storage • issue resolution • personal protective equipment • purchasing of supplies and equipment • workplace inspections, including plant and equipment.

WHS recordkeeping may relate to:	• audit and inspection reports
	• consultation, such as:
	  • meetings of health and safety committees
	  • work team meeting agendas, including WHS items and actions
	• first aid/medical post records
	• hazardous chemicals registers
	• induction, instruction and training
	• manufacturer and supplier information, including dangerous goods storage lists
	• plant and equipment maintenance and testing reports
	• workers' compensation and rehabilitation records
	• workplace environmental monitoring records.

Unit Sector(s)

Regulation, Licensing and Risk – Work Health and Safety

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BSBWOR501B Manage personal work priorities and professional development

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit describes the performance outcomes, skills and knowledge required to manage own performance and professional development. Particular emphasis is on setting and meeting priorities, analysing information and using a range of strategies to develop further competence. No licensing, legislative, regulatory or certification requirements apply to this unit at the time of endorsement.

Application of the Unit

Application of the unit	This unit applies to managers and focuses on the need for managers to be organised, focussed and skilled, in order to effectively manage the work of others. As such it is an important unit for most managers, particularly as managers serve as role models and have a significant influence on the work culture and patterns of behaviour.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

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Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Establish personal work goals	1.1. Serve as a positive role model in the workplace through personal work planning and organisation 1.2. Ensure personal work goals, plans and activities reflect the organisation's plans, and ***own responsibilities and accountabilities*** 1.3. Measure and maintain personal performance in varying work conditions, work contexts and contingencies
2. Set and meet own work priorities	2.1. Take initiative to prioritise and facilitate competing demands to achieve personal, team and organisational goals and objectives 2.2. Use ***technology*** efficiently and effectively to manage work priorities and commitments 2.3. Maintain appropriate work-life balance, and ensure stress is effectively managed and health is attended to
3. Develop and maintain professional competence	3.1. Assess personal knowledge and skills against ***competency standards*** to determine development needs, priorities and plans 3.2. Seek feedback from employees, ***clients and colleagues*** and use this feedback to identify and

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ELEMENT	PERFORMANCE CRITERIA
	develop ways to improve competence 3.3. Identify, evaluate, select and use ***development opportunities*** suitable to personal learning style/s to develop competence 3.4. Undertake participation in networks to enhance personal knowledge, skills and work relationships 3.5. Identify and develop new skills to achieve and maintain a competitive edge

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
• communication skills to receive, analyse and report on feedback • literacy skills to interpret written and verbal information about workplace requirements • organisational skills to set and achieve priorities.
Required knowledge

• principles and techniques involved in the management and organisation of:
  • performance measurement
  • personal behaviour, self-awareness and personality traits identification
  • personal development plan
  • personal goal setting
  • time management
• management development opportunities and options for self
• organisation's policies, plans and procedures
• types of learning style/s and how they relate to the individual
• types of work methods and practices that can improve personal performance.

Evidence Guide

EVIDENCE GUIDE
The Evidence Guide provides advice on assessment and must be read in conjunction with the

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EVIDENCE GUIDE	
performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Evidence of the following is essential: • systems and processes (electronic or paper-based) used to organise and prioritise tasks, which show how work is managed • personal development plan, with career objectives and an action plan
Context of and specific resources for assessment	Assessment must ensure: • access to appropriate documentation and resources normally used in the workplace.
Method of assessment	A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate for this unit: • analysis of responses to case studies and scenarios • direct questioning combined with review of portfolios of evidence and third party workplace reports of on-the-job performance by the candidate • observation of presentations • oral or written questioning to asses knowledge of work methods and practices that can improve personal performance • review of personal work goals, plans and activities • evaluation of work-life balance • review of documentation assessing personal knowledge and skills against competency standards.
Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended, for example: • other units from the Diploma of Management.

Range Statement

RANGE STATEMENT
The range statement relates to the unit of competency as a whole. It allows for different

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RANGE STATEMENT	
work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Own responsibilities and accountabilities may include:	• expectations of workplace performance as expressed in a performance plan • outputs as expressed in position descriptions or duty statements • statement of conduct outlining an individual's responsibilities/actions/performance
Technology may include:	• computerised systems and software, databases, project management and word processing • electronic diary • personal digital assistant (PDA)
Competency standards may include:	• enterprise-specific units of competency consistent with work requirements • nationally endorsed units of competency consistent with work requirements
Clients and colleagues may be:	• colleagues at the same level and more senior managers • internal or external customers • people from a wide range of social, cultural and ethnic backgrounds and with a range of physical and mental abilities • team members
Development opportunities may include:	• action learning • coaching • exchange/rotation • induction • mentoring • shadowing • structured training programs

Unit Sector(s)

Unit sector	

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Competency field

Competency field	Management and Leadership - Management

Co-requisite units

Co-requisite units		

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BSBWOR502B Ensure team effectiveness

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit describes the performance outcomes, skills and knowledge required to facilitate all aspects of teamwork within the organisation. It involves taking a leadership role in the development of team plans, leading and facilitating teamwork and actively engaging with the management of the organisation. No licensing, legislative, regulatory or certification requirements apply to this unit at the time of endorsement.

Application of the Unit

Application of the unit	This unit applies to managers and addresses the need for managers to facilitate work teams and to build a positive culture within work teams. The unit takes a systematic and planned approach to developing teams. It includes the soft skills as well as more structured approaches to the management of teams. At this level, work will normally be carried out within complex and diverse methods and procedures which require the exercise of considerable discretion and judgement, using a range of problem solving and decision making strategies.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Establish team performance plan	1.1. ***Consult*** team members to establish a common understanding of team purpose, roles, responsibilities and ***accountabilities*** in accordance with organisational goals, plans and objectives 1.2. Develop ***performance plans*** to establish expected ***outcomes***, ***outputs***, ***key performance indicators*** and goals for work team 1.3. ***Support*** team members in meeting expected performance outcomes
2. Develop and facilitate team cohesion	2.1. Develop ***strategies*** to ensure team members have input into planning, decision making and operational aspects of work team 2.2. Develop ***policies and procedures*** to ensure team members take responsibility for own work and assist

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ELEMENT	PERFORMANCE CRITERIA
	others to undertake required roles and responsibilities 2.3. Provide feedback to team members to encourage, value and reward individual and team efforts and contributions 2.4. Develop ***processes*** to ensure that issues, concerns and problems identified by team members are recognised and addressed
3. Facilitate teamwork	3.1. Encourage team members and individuals to participate in and to take responsibility for team activities, including communication processes 3.2. Support the team in identifying and resolving work performance problems 3.3. Ensure own contribution to work team serves as a role model for others and enhances the organisation's image for all ***stakeholders***
4. Liaise with stakeholders	4.1. Establish and maintain open communication processes with all stakeholders 4.2. Communicate information from ***line manager***/***management*** to the team 4.3. Communicate unresolved issues, concerns and problems raised by team members and follow-up with line manager/management and other relevant stakeholders 4.4. Evaluate and take necessary corrective action regarding unresolved issues, concerns and problems raised by internal or external stakeholders

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
• communication skills to explain team goals, to address team conflict and to build an environment of trust • planning and organisational skills to keep team on track and focussed on work outcomes.
Required knowledge

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REQUIRED SKILLS AND KNOWLEDGE
• group behaviour • strategies for mentoring and coaching to informally guide and instruct team members • issue resolution • strategies for gaining consensus.

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Evidence of the following is essential: • range of techniques that can be used to build work teams, strengthen communications in the team and resolve issues • methods for engaging with stakeholders and obtaining advice from outside the work team, to ensure team is focussed and on track • knowledge of group behaviour.
Context of and specific resources for assessment	Assessment must ensure: • access to appropriate documentation and resources normally used in the workplace.
Method of assessment	A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate for this unit: • analysis of responses to case studies and scenarios • assessment of written reports • demonstration of team building techniques • direct questioning combined with review of portfolios of evidence and third party workplace reports of on-the-job performance by the candidate • observation of performance in role plays • review of performance plans developed for work team • review of policies and procedures developed to

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EVIDENCE GUIDE	
	ensure team members take responsibility for own work.
Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended, for example: • other units from the Diploma of Management.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Consultation may refer to:	• conducting meetings, interviews, brainstorming sessions, email/intranet communications, newsletters or other processes and devices which ensure that all employees have the opportunity to contribute to team and individual performance plans • mechanisms used to provide feedback to the work team in relation to outcomes of consultation
Accountabilities may refer to:	• responsibilities as defined in position descriptions, codes of conduct/behaviour, duty statements or similar • statement of conduct outlining responsibilities/actions/performance
Performance plans may refer to:	• individual performance plans linked to team goals • team plans based on work assignments and responsibilities
Outcomes, ***outputs***, ***key performance indicators*** may refer to agreed:	• changes in work roles and responsibilities • improved individual and team, performance and participation • improvements to systems, operations • measures for monitoring and evaluating the

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RANGE STATEMENT	
	efficiency or effectiveness of systems or services • quality standards and expectations • targets for productivity improvements such as reduced downtime, higher production levels, decreases in absenteeism • targets for training and development
Support may include:	• Coaching • Mentoring • Training and development opportunities • Clarification of roles and expectations • Long term or short term plans • Meetings
Strategies may refer to:	• clarification of roles and expectations • electronic communication devices and processes, such as intranet and email communication systems, to facilitate input • long-term or short-term plans factoring in opportunities for team input • mentoring and 'buddy' systems to support team members in providing input • newsletters and briefings • training and development activities
Policies and procedures may refer to:	• organisational guidelines and systems that govern operational functions • procedures that detail the activities that must be carried out for the completion of actions and tasks • Standard Operating Procedures
Processes may refer to:	• brainstorming options with the team for addressing concerns • creating a matrix of issues and concerns and distributing for comment • discussions with individuals regarding their concerns • distributing drafts for comment with a range of options for resolution of concerns • training and development sessions
Stakeholders may include:	• Board members • business or government contacts • funding bodies

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RANGE STATEMENT	
	• union/employee groups and representatives • work team
Line manager*/*management may refer to:	• chief executive officer • direct superior • other management representatives

Unit Sector(s)

Unit sector	

Competency field

Competency field	Industry Capability - Workplace Effectiveness

Co-requisite units

Co-requisite units		

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CPCCCM2007B Use explosive power tools

Modification History

Minor changes made to range statement, including addition of photovoltaic (solar) panels

Equivalent to CPCCCM2007A

Unit Descriptor

This unit of competency specifies the outcomes required to apply safe and effective operation of explosive power tools (EPT), used to fasten materials or fix fasteners to bases. It includes both direct action and indirect action explosive powered fastening tools.

Application of the Unit

This unit of competency supports achievement of skills to safely and effectively use a range of EPT used in the construction industry.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

CPCCOHS2001A	Apply OHS requirements, policies and procedures in the construction industry

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

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Elements and Performance Criteria

1	Plan and prepare.	1.1	Work instructions, including plans, specifications, quality requirements and operational details, are obtained, confirmed and applied from relevant ***information*** for ***planning and preparation***.
		1.2	***Safety (OHS)*** requirements are followed in accordance with safety plans and policies.
		1.3	Signage and barricade requirements are identified and implemented.
		1.4	Plant, ***tools and equipment*** selected to carry out tasks are consistent with job requirements, checked for serviceability, and any faults are rectified or reported prior to commencement.
		1.5	Material quantity requirements are calculated in accordance with plans and specifications.
		1.6	***Materials*** appropriate to work application are identified, obtained, prepared, safely handled and located ready for use.
		1.7	***Environmental requirements*** are identified for the project in accordance with environmental plans and ***statutory and regulatory authority*** obligations, and are applied.
2	Set out fasteners.	2.1	***Minimum distances for set out*** from edge of substrate material are adhered to in accordance with legislation, regulations and codes of practice.
		2.2	Material is located and temporarily held or fixed into designed position according to detailed drawings.
3	Use EPT.	3.1	EPT is checked for operation according to manufacturer specifications and safety (OHS) requirements for ***use of EPT***.
		3.2	Fastener is selected according to requirements of job.
		3.3	Charge is selected to assessed requirements for material,

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			base and penetration.
		3.4	***Attachments*** and accessories are installed to EPT in accordance with manufacturer specifications and safety (OHS) requirements.
		3.5	***Fastener and charge*** in EPT are located to manufacturer specifications.
		3.6	EPT operation is carried out and fastener is fixed into place in accordance with manufacturer recommendations, legislation, regulations and codes of practice.
		3.7	Fastening penetration is checked and appropriate depth into material is applied.
		3.8	Power regulating device is adjusted for conditions.
		3.9	Misfire procedures are carried out according to manufacturer recommendations, legislation, regulations and codes of practice.
		3.10	Temporary holding and fixings are removed without damage to material.
4	Secure and store equipment and charges.	4.1	Charges are stored in designated container in accordance with legislation, regulations and codes of practice and used charges are recorded.
		4.2	Unused fasteners, the EPT and attachments are stored in a carry case in line with manufacturer recommendations.
		4.3	Logbook is checked and maintenance recorded according to manufacturer recommendations.
5	Maintain EPT and kit.	5.1	Safety features of tools are checked for serviceability in accordance with manufacturer operating manual.
		5.2	Tools are cleaned and lubricated to manufacturer recommendations.
		5.3	Periodic maintenance service is carried out to manufacturer specifications.
		5.4	Diminished stocks of charges and fasteners are

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			replenished to designed effectiveness of EPT kit.
6	Clean up.	6.1	Work area is cleared and materials disposed of, reused or recycled in accordance with legislation, regulations, codes of practice and job specification.
		6.2	Plant, tools and equipment are cleaned, checked, maintained and stored in accordance with manufacturer recommendations and standard work practices.

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills for this unit are:

- communication skills to:
  - determine requirements
  - enable clear and direct communication, using questioning to identify and confirm requirements, share information, listen and understand
  - follow instructions
  - read and interpret:
    - documentation from a variety of sources
    - drawings and specifications
  - report faults
  - use language and concepts appropriate to cultural differences
  - use and interpret non-verbal communication, such as hand signals
  - written skills to record maintenance in logbook
- identifying and accurately reporting to appropriate personnel any faults in tools, equipment or materials
- numeracy skills to apply measurements and make calculations
- organisational skills, including the ability to plan and set out work
- teamwork skills to work with others to action tasks and relate to people from a range of cultural and ethnic backgrounds and with varying physical and mental abilities
- technological skills to:
  - use a range of mobile technology, such as two-way radio and mobile phones
  - voice and hand signals to access and understand site-specific instructions.

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Required knowledge

Required knowledge for this unit is:

- construction terminology
- EPT materials
- EPT charges and fasteners
- equipment safety manuals and instructions
- job safety analysis (JSA) and safe work method statements
- material safety data sheets (MSDS)
- materials storage and environmentally friendly waste management
- plans, specifications and drawings
- processes for the calculation of material requirements
- quality requirements
- relevant Acts, regulations and codes of practice
- security and storage procedures for equipment and charges
- types, characteristics, uses and limitations of plant, tools and equipment
- workplace and equipment safety requirements.

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Overview of assessment	This unit of competency could be assessed in the workplace or a close simulation of the workplace environment, provided that simulated or project-based assessment techniques fully replicate construction workplace conditions, materials, activities, responsibilities and procedures.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	A person who demonstrates competency in this unit must be able to provide evidence of the ability to: • locate, interpret and apply relevant information, standards and specifications • comply with site safety plan and OHS legislation, regulations and codes of practice applicable to workplace operations • comply with organisational policies and

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procedures, including quality requirements
- safely and effectively use tools and equipment
- communicate and work effectively and safely with others
- fix metal or timber to a steel, concrete or masonry base on one project of each to job specifications, including:
  - completion of stripping and assembly of the tool
  - completing log of serviceability
  - maintaining and cleaning
  - selecting charges and fasteners applicable to base material and material being fixed
  - misfire procedures
  - using attachments
  - complying with storage and security regulations and OHS requirements for the working environment
  - selecting signage
  - test fire.

Context of and specific resources for assessment

This competency is to be assessed using standard and authorised work practices, safety requirements and environmental constraints.

Assessment of essential underpinning knowledge will usually be conducted in an off-site context.

Assessment is to comply with relevant regulatory or Australian standards' requirements.

Resource implications for assessment include:

- an induction procedure and requirement
- realistic tasks or simulated tasks covering the mandatory task requirements
- relevant specifications and work instructions
- tools and equipment appropriate to applying safe work practices
- support materials appropriate to activity
- workplace instructions relating to safe work practices and addressing hazards and emergencies
- material safety data sheets
- research resources, including industry related systems information.

Reasonable adjustments for people with disabilities

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must be made to assessment processes where required. This could include access to modified equipment and other physical resources, and the provision of appropriate assessment support.

Method of assessment

Assessment methods must:

- satisfy the endorsed Assessment Guidelines of the Construction, Plumbing and Services Training Package
- include direct observation of tasks in real or simulated work conditions, with questioning to confirm the ability to consistently identify and correctly interpret the essential underpinning knowledge required for practical application
- reinforce the integration of employability skills with workplace tasks and job roles
- confirm that competency is verified and able to be transferred to other circumstances and environments.

Validity and sufficiency of evidence requires that:

- competency will need to be demonstrated over a period of time reflecting the scope of the role and the practical requirements of the workplace
- where the assessment is part of a structured learning experience the evidence collected must relate to a number of performances assessed at different points in time and separated by further learning and practice, with a decision on competency only taken at the point when the assessor has complete confidence in the person's demonstrated ability and applied knowledge
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence.

Assessment processes and techniques should as far as is practical take into account the language, literacy and numeracy capacity of the candidate in relation to the competency being assessed.

Supplementary evidence of competency may be obtained from relevant authenticated documentation from third parties, such as existing supervisors, team leaders or specialist training staff.

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Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Information includes:

- diagrams or sketches
- instructions issued by authorised organisational or external personnel
- manufacturer specifications and instructions where specified
- memos
- MSDS
- organisation work specifications and requirements
- plans and specifications
- regulatory and legislative requirements pertaining to using EPT
- relevant Australian standards
- safe work procedures related to using EPT
- signage
- verbal or written and graphical instructions
- work bulletins
- work schedules.

Planning and preparation include:

- work site inspection
- equipment defect identification
- assessment of conditions and hazards
- determination of work requirements.

Safety (OHS) is to be in accordance with legislation, regulations, codes of practice, organisational safety policies and procedures, and project safety plan and may include:

- emergency procedures, including extinguishing fires, organisational first aid requirements and evacuation
- handling of materials
- hazard control
- hazardous materials and substances
- safe operating procedures, including the conduct of operational risk assessment and treatments associated with:
  - earth leakage boxes

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- lighting
- photovoltaic (solar) panels
- power cables, including overhead service trays, cables and conduits
- restricted access barriers
- surrounding structures
- traffic control
- trip hazards
- work site visitors and the public
- working at heights
- working in confined spaces
- working in proximity to others
- working with dangerous materials

- organisational first aid
- personal protective clothing and equipment prescribed under legislation, regulations and workplace policies and practices
- use of firefighting equipment
- use of tools and equipment
- workplace environment and safety.

Tools and equipment may include:

- direct action EPT
- indirect action EPT
- clamps and levels.

Materials include:

- timber
- metals
- patented fasteners.

Environmental requirements include:

- clean-up management
- noise and dust
- vibration
- waste management.

Statutory and regulatory authorities include:

- federal, state and local authorities administering applicable Acts, regulations and codes of practice.

Minimum distance for set out of

- regulated minimum distances
- bases, including concrete, masonry or steel.

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fasteners is to be in accordance with:

Use of EPT includes:

- stripping and assembling tools
- completing log of serviceability
- maintaining and cleaning tools
- selecting charges and fasteners applicable to the base material and material being fixed
- misfire procedures
- using attachments
- complying with storage and security regulations and OHS requirements for the working environment
- selecting signage
- test fire.

Attachments include:

- channel, rebate and other manufacturer attachments.

Fastener and charge include:

- firing a test shot with misfire procedures, complying with the regulated safety procedure for misfire.

Unit Sector(s)

Functional area

Unit sector Construction

Custom Content Section

Not applicable.

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CPCCLDG3001A Licence to perform dogging

Modification History

Not Applicable

Unit Descriptor

Unit descriptor This unit specifies the outcomes required to perform slinging techniques, including the selection and inspection of lifting gear and/or the directing of the crane operator in the movement of the load when the load is out of view of the crane/ operator for licensing purposes.

Application of the Unit

Application of the unit

This unit covers the scope of work to demonstrate competency in the application of slinging techniques, selection and inspection of lifting gear and/or the directing of the crane/ operator in the movement of the load.

This unit is based upon the National Standard for Licensing Persons Performing High Risk Work.

This unit in its current form meets state and territory licensing requirements. Any alteration will result in a unit which is not acceptable to regulators for the purpose of licensing.

Licensing/Regulatory Information

Refer to Unit Descriptor

Pre-Requisites

Prerequisite units Nil

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Employability Skills Information

Employability skills This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Plan job.	1.1. ***Site information*** is obtained and related to the task. 1.2. ***Hazard*** s and potential hazards associated with the slinging and directing of loads are identified. 1.3. ***Hazard control measures*** consistent with ***appropriate standards*** are identified to ensure the safety of personnel and equipment. 1.4. The weight, dimensions and centre of gravity of the load are identified and assessed. 1.5. Suitable lifting/slinging points on the load are identified. 1.6. Appropriate ***lifting equipment*** needs are assessed. 1.7. Appropriate ***communication methods*** are assessed with ***crane***/ operators and other ***appropriate personnel***. 1.8. Manufacturer's specifications/information is obtained for special loads where necessary.
2. Select and inspect equipment.	2.1. Lifting equipment appropriate to the task is selected. 2.2. Lifting equipment is inspected for serviceability. 2.3. Damaged or excessively worn lifting equipment is identified, labelled and rejected.

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ELEMENT	PERFORMANCE CRITERIA
	2.4. Appropriate communication methods for the crane/operator and appropriate personnel are selected. 2.5. Appropriate ***communication equipment*** is selected and its serviceability is checked. 2.6. Appropriate ***personal protective equipment*** (PPE) is selected and checked.
3. Prepare site and equipment.	3.1. Hazard prevention/control measures are applied consistent with appropriate standards to ensure the safety of personnel and equipment. 3.2. Appropriate slinging method is selected. 3.3. Lifting equipment is prepared and assembled where appropriate. 3.4. Load destination is prepared.
4. Perform task.	4.1. Lifting equipment is attached and secured to the lifting hook using appropriate techniques. 4.2. Lifting hook is positioned over the load centre of gravity. 4.3. Lifting equipment is attached and secured to the load in an appropriate manner. 4.4. Tag line is attached and secured where appropriate. 4.5. Test lift is conducted to ensure security of load. 4.6. Load is moved maintaining stability and control at all times. 4.7. Appropriate communication methods and ***communication signals*** are applied to safely coordinate the load movement both within sight and out-of-sight of crane operator. 4.8. The load is landed to ensure that it is stable and secure from movement. 4.9. Lifting equipment is removed or disconnected from load and prepared for next task or storage.
5. Shut down job and clean up.	5.1. Unserviceable lifting equipment inspected and rejected. 5.2. ***Defective equipment*** is isolated and tagged. 5.3. Lifting equipment is stored in accordance with procedures and appropriate standards. 5.4. Hazard prevention/control measures are removed where appropriate. 5.5. Excess materials from the work area are removed (where applicable).

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ELEMENT	PERFORMANCE CRITERIA
	5.6. Defects are reported and recorded according to procedures and appropriate action is taken.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Required skills for this unit are:

- communication techniques in the workplace including whistles, hand signals and use of fixed channel two-way radios
- communication skills at a level sufficient to communicate with other site personnel
- calculate rated capacity of lifting equipment
- apply different methods for making temporary connections to loads using fibre and synthetic ropes
- ability to interpret rated capacity and working load limit tags
- hazard identification and control
- slinging techniques
- selection and inspection of lifting equipment
- directing crane operators in the moving of loads in a safe manner, using a slewing crane
- inspection and care of a wide range of lifting equipment to appropriate Australian Standards and/or manufacturer's specifications.

Required knowledge

Required knowledge for this unit is:

- appropriate mathematical procedures for estimation and measurement of loads
- basic knowledge of types of cranes and their functions
- Commonwealth, state or territory OHS legislation, standards and codes of practice relevant to the full range of techniques for undertaking dogging activities
- load stability and safety factors in line with manufacturer's specifications
- types of lifting equipment and slinging techniques for use, and their limitations and performance in a wide range of conditions (including but not limited to slings, beams, accessories, clamps, work-boxes, bins and pallets)
- understanding of the hierarchy of control.

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Evidence Guide

EVIDENCE GUIDE

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Overview of assessment	Successful assessment of this unit meets the competency requirement of the National Standard for licensing Persons Performing High Risk Work. State/Territory OHS regulators have mandated the use of Assessment Instruments and Instructions for Assessment of this unit which have been endorsed by the national body responsible for OHS matters.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	A person who demonstrates competency in this unit must be able to provide evidence of the ability to: • comply with Commonwealth, state or territory OHS legislation, standards relevant to safe dogging and crane operations. • communicate and work safely with others in the work area. • apply Hazard prevention and control measures consistent with appropriate standards. • apply to move loads in conjunction with cranes including, the reading of tags, slinging, loading, directing and landing loads with a slewing mobile crane with a telescopic boom and a winch, in and out of sight of the crane/ operator, moving four loads of varying shapes, sizes and weights. • use fibre and/or synthetic rope as tag lines, and connecting to loads using clove hitch, rolling hitch, bowline and single sheetbend. • conduct pre and post operational checks of the lifting equipment.
Context of and specific resources for assessment	• Assessment of the safe and effective application of knowledge and skill to workplace tasks (performance) must be undertaken using the national OHS endorsed Assessment Instrument • Assessment of performance must be

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EVIDENCE GUIDE

	undertaken either in the workplace or in a realistically simulated workplace setting
	• Assessors must ensure that the assessment in the workplace is organised through a workplace supervisor to ensure that all the required equipment and materials and a suitable working area is made available to suit the assessment and the workplace
	• Assessment must occur under standard and authorised work practices, safety requirements and environmental constraints
	• Assessment is to comply with the requirements of any relevant Standards or operating procedures for dogging activities
	• Applicants must have access to:
	  • personal protective equipment (PPE) for the purpose of the performance assessment.
	  • four different loads as prescribed in the endorsed assessment instrument
	  • lifting and associated equipment
	  • suitable slewing crane
	  • communication equipment (eg. fixed channel, two-way radios) as applicable.

Method of assessment	Assessment must be conducted using the national OHS endorsed Assessment Instrument. This Instrument provides instruction on the application of the assessment. Assessment may be in conjunction with the assessment of other units of competency. The use of **'simulators'** in the assessment of this unit of competency is **not acceptable**. Assessment methods must confirm consistency and accuracy of performance together with application of underpinning knowledge. Assessment must confirm a reasonable inference that competency is not only able to be satisfied under the particular circumstance, but is able to be transferred to other circumstances.
Guidance information for assessment	Further information about endorsed Assessment Instruments may be obtained from state/territory OHS regulators.

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Range Statement

RANGE STATEMENT

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Site informationmay include but not be limited to	• local conditions such as access and egress • work method statements.
Hazards may include but not limited to:	• ground stability (eg. ground condition, recently filled trenches, slopes) • overhead hazards (e.g. power lines, service pipes, trees, buildings, etc) • insufficient lighting • traffic (e.g. pedestrians, vehicles, plant) • weather (e.g. wind, lightning, storms) • other specific hazards (e.g. trip hazards, heights, radio interference, etc).
Hazard prevention/control measures	The systematic process of eliminating or reducing the risk to personnel and property through the application of controls. It includes the application of the hierarchy of controls, including: 1. elimination. 2. substitution. 3. isolation. 4. engineered control measures. 5. safe work practices. 6. personal protective equipment.
Appropriate standard s may include:	• codes of practice • legislation • Australian Standards • manufacturer's specifications • industry standards.

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Lifting Equipment may include but not limited to:	• fibre ropes • wire ropes • chain • wire and synthetic slings • shackles • eyebolts • beam clamps • plate clamps • spreader beams • lifting beams • pallet forks and cages • concrete kibbles • personnel boxes.
Communication Methods may include but are not limited to:	• written instructions • signage, • hand signals • listening • questioning to confirm understanding • appropriate worksite protocol.
Cranes may include but not limited to:	• tower cranes (including self erecting) • portal boom cranes • vehicle loading cranes • slewing mobile cranes • non-slewing cranes • derrick cranes.
Appropriate personnel may include but are not limited to:	• supervisors • colleagues • managers who are authorised to take responsibility for the workplace or operations.
Communication Equipment may include but not limited to:	• fixed channel two-way radios • whistles • bells.
Personal protective equipment (PPE) may include but not limited to:	• hard hat • safety boots • gloves • high visibility clothing • reflective vest • relevant breathing, hearing, sight, skin and sun protection.
Load destination may include but	• ground

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RANGE STATEMENT

not limited to:	• loading platforms • suspended floors • vehicles.
Communication signals may include but not limited to:	• stop - hand • stop - whistle • hoist up - hand • hoist up - whistle • hoist down - hand • hoist down - whistle • luff boom down - hand • luff boom down - whistle • luff boom up - hand • luff boom up - whistle • telescope out - hand • telescope out - whistle • telescope in - hand • telescope in - whistle • slew left - hand • slew left - whistle • slew right - hand • slew right - whistle.
Defective Equipment may include but not limited to:	• excessive wear • damage • stretched • broken wires • cut/damaged fibres.

Unit Sector(s)

Unit sector Construction

Co-requisite units

Co-requisite units Nil

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Co-requisite units Nil

Functional area

Functional area

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CPCCLHS3001A Licence to operate a personnel and materials hoist

Modification History

Not Applicable

Unit Descriptor

Unit descriptor This unit specifies the outcomes required to operate a builder's hoist in which personnel, goods and/or materials may be hoisted, and which comprises a car, structure, machinery or other equipment associated with the hoist, and which may be a cantilever hoist, a tower hoist or a multiple winch operation. Included in this definition are situations where winches may be configured to operate as hoists for the transportation of personnel for licensing purposes.

Application of the Unit

Application of the unit

This unit requires the operator to plan work, conduct routine checks, conduct hoist operations and shut down and secure a hoist.

This unit is based on the requirements of the National Standard for Licensing Persons Performing High Risk Work.

This unit in its current form meets state and territory licensing requirements. Any alteration will result in a unit, which is not acceptable to regulators for the purpose of licensing.

Licensing/Regulatory Information

Refer to Unit Descriptor

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Pre-Requisites

Prerequisite units Nil

Employability Skills Information

Employability skills This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Plan work.	1.1. Potential workplace ***hazards*** are identified. 1.2. ***Hazard prevention***/***control measures*** are identified consistent with ***appropriate standards*** to ensure the safety of personnel and equipment. 1.3. The ***hoist*** is appropriate to the load/s and workplace conditions. 1.4. The weight of the load is determined according to ***procedures***. 1.5. Appropriate communication methods are identified with appropriate personnel.
2. Conduct routine checks.	2.1. Hoist is visually checked for any damage or detects. 2.2. Appropriate hazard prevention/control measures are applied to the work area according to procedures and potential hazards.

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ELEMENT	PERFORMANCE CRITERIA
	2.3. ***Service logbook*** for the hoist is checked for compliance. 2.4. ***Routine pre-start operational checks*** are carried out according to procedures. 2.5. Main power supply is switched on. 2.6. Hoist is started according to procedures and checks made for any abnormal noises. 2.7. All controls located and checked for serviceability. 2.8. Post start operational checks are carried out according to procedures. 2.9. All ***communication equipment***, lighting and alarm systems are checked for serviceability. 2.10. All hoist ***safety devices*** are tested to their maximum according to procedures. 2.11. All damage and defects are reported and recorded according to procedures and appropriate action taken.
3. Conduct hoist operations.	3.1. Hoist is operated according to procedures. 3.2. Communication methods associated with hoist movements are conducted according to procedures and the appropriate standards. 3.3. Loads and load distribution are continually monitored to ensure that the hoist is operated within its capacity according to procedures. 3.4. Hoist movement is monitored constantly ensuring safety to appropriate personnel and hoist stability. 3.5. ***Unplanned and/or unsafe situations*** are responded to in line with procedures.
4. Shut down and secure hoist.	4.1. Hoist is ***shut down*** according to procedures. 4.2. All fences and gates are secured according to procedures. 4.3. Routine post -operational checks are carried out according to procedures. 4.4. Power is isolated and secured against unauthorised access. 4.5. All damage and defects are reported and recorded according to procedures and appropriate action taken.

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Required skills for this unit are:

- accurately record and maintain information relating to personnel and materials hoist operations
- communication techniques in the workplace including bells, lights, intercom and use of two-way radios
- conduct personnel and materials hoist operations
- operate emergency brake and decent system
- hazards associated with the operation of the personnel and materials hoist are identified, risks are assessed and effective hazard prevention/control measures for those hazards identified and put into place
- inspect personnel and materials hoist equipment, safety equipment and installation for safe operation including general maintenance
- communication skills at a level sufficient to communicate with other site personnel (e.g. receive and interpret work instructions, safety information, emergency procedures)
- verify problems and equipment faults and demonstrate appropriate response.

Required knowledge

Required knowledge for this unit is:

- weight of the load is determined from labels, markings or load paperwork
- level of literacy to be able to read and comprehend manufacturer's instructions, procedures and safety signs
- Commonwealth, state or territory OHS legislation, standards and codes of practice relevant to the full range of processes for the hoist class
- hoist operations and operating techniques
- understanding of the hierarchy of hazard identification and control
- materials safety data sheets and requirements for safe movement of materials
- organisational and workplace standards, requirements, policies and procedures for conducting operations for the hoist class
- procedures for the recording, reporting and maintenance of workplace records and information
- rated capacity and working load limits
- typical routine problems encountered in the operation of a personnel and materials hoist, inspection techniques and adjustments required for correction.

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Evidence Guide

EVIDENCE GUIDE

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Overview of assessment	Successful assessment of this unit meets the competency requirement of the National Standard for licensing Persons Performing High Risk Work. State/territory OHS regulators have mandated the use of Assessment Instruments and Instructions for Assessment for this unit which have been endorsed by the national body responsible for OHS matters.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	A person who demonstrates competency in this unit must be able to provide evidence of the ability to: • comply with OHS licensing legislation • effectively communicate and work safely with others in the work area • identify hazards associated with the operation of the hoist and put in place effective hazard controls for those hazards identified • determine load weights • effectively conduct personnel and materials hoist operations to include the tasks of raising and lowering loads with hoist; in conjunction with awareness of the limitations of the hoist according to manufacturer's specifications • ensure hoist controls are attended throughout operation. • effectively conduct emergency lowering of the hoist according to the emergency lowering procedure • effectively conduct pre operational and shut down checks of the personnel and materials hoist (particular awareness of controls, alarms and lockout devices).
Context of and specific resources for assessment	• Assessment of the safe and effective application of knowledge and skill to workplace tasks (performance) must be undertaken using the endorsed Assessment Instrument

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EVIDENCE GUIDE

	• Assessment of performance must be undertaken either in the workplace or in a realistically simulated workplace
	• Assessors must ensure that the assessment in the workplace is organised to ensure that all the required equipment and materials and a suitable working area is made available to suit the assessment and the workplace
	• Assessment must occur under standard and authorised work practices, safety requirements and environmental constraints
	• Assessment is to comply with relevant appropriate standard requirements
	• Applicants must have access to:
	  • personal protective equipment (PPE) for the purpose of the Performance Assessment.
	  • appropriate personnel and material hoist and associated equipment in safe condition
	  • suitable loads as specified by the endorsed assessment instrument
	  • communication equipment (e.g. two-way radios, intercoms, light systems, buzzers, bells etc)

Method of assessment	Assessment must be conducted using the endorsed Assessment Instruments. These Instruments provide advice on their application. The use of **'simulators'** in the assessment of this unit of competency is **not acceptable**. Assessment may be in conjunction with the assessment of other units of competency. Assessment methods must confirm consistency and accuracy of performance together with application of underpinning knowledge. Assessment must confirm a reasonable inference that competency is not only able to be satisfied under the particular circumstance, but is able to be transferred to other circumstances.
Guidance information for assessment	Further information about endorsed Assessment Instruments may be obtained from state/territory OHS regulators.

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Range Statement

RANGE STATEMENT

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Hazards may include but are not limited to:	• ground conditions (e.g. condition of pavement, slopes) • overhead hazards (e.g. power lines, service pipes) • traffic (e.g. pedestrians, vehicles, other plant) • environmental conditions (e.g. wind, lightning, rain) • hoist overload • other specific hazards (e.g. dangerous materials).
Hazard prevention/control measures may include:	Refers to the systematic process of eliminating or reducing the risk to personnel and property through the application of controls. It includes application of the hierarchy of control, the six step preference of control measures to manage and control risk: • elimination • substitution • isolation • engineering control measures • using safe work practices • personal protective equipment
Appropriate standards may include:	• codes of practice • legislation • Australian standards • manufacturer specifications.
Hoist includes:	• the operation of a builder's hoist in which personnel, goods and/or materials may be hoisted, and which comprises a car, structure, machinery or other equipment associated with the hoist, and which may be a cantilever hoist, a tower hoist or a multiple winch operation.

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RANGE STATEMENT

	Included in this definition are situations where winches may be configured to operate as hoists for the transportation of personnel.
Procedures may include but not limited to:	• manufacturer's guidelines (instructions, specifications or checklists) • industry operating procedures • workplace procedures (work instructions, operating procedures, checklists).
Communication methods may include but not limited to:	• verbal and non-verbal language • written instructions • signage • hand signals • listening • questioning to confirm understanding • appropriate worksite protocol • interfloor/level communications
Appropriate personnel may include but not limited to:	• those associated with the operations of the personnel and materials hoist • supervisors • colleagues • managers who are authorised to take responsibility for the workplace or operations.
Service logbook may include but is not limited to:	• any logbook • service book • history record system where the service and maintenance history is kept.
Routine pre start operational checks may include but not limited to:	• ground stability • tower ties/guys are secure • power supply is covered by earth leakage protection • power leads secured above ground level and not attached to scaffolds or building structure • tower guides are clean and free of rust and damage • signs are clearly displayed and legible • brakes and drive mechanism • overhead protection • intercom and signalling systems • barriers, fencing and gates • fuels, oil and water • lubrication (grease)

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RANGE STATEMENT

	• hoist rope • sheaves and anchorage points.
Communication equipment may include but not limited to:	• fix frequency two-way radios • bells • buzzers • lights. **NB**: where radio communication equipment is used the transmitting frequencies of the equipment must be selected to prevent interference to or from other radio equipment being used in the vicinity of the hoist.
Safety devices may include but not limited to:	• emergency braking system • overrun limits • gate interlocks • personnel access interlock on hoist roof.
Appropriate standards may include but are not limited to:	• codes of practice • legislation • Australian Standards • manufacturer's specifications • industry standards (where applicable).
Unplanned and/or unsafe situations may include but not limited to:	• failure/loss of control e.g. power supply, braking system • failure of equipment e.g. hydraulic system, broken hoist cable, damaged gear drive • environmental conditions e.g. wind, lightning, storms.
Shut down may include but not limited to:	• platform positioned at base of tower • lock on manual safety brake • landing gates secured to prevent unauthorised access • power isolated from control panel • mains power supply isolated and secured • internal combustion engine idled to stabilise temperature • engine turned off • fencing/barriers around base secured to prevent unauthorised access • key removed (where applicable).

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Unit Sector(s)

Unit sector Construction

Co-requisite units

Co-requisite units Nil

Functional area

Functional area

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CPCCLHS3002A Licence to operate a materials hoist

Modification History

Not Applicable

Unit Descriptor

Unit descriptor This unit specifies the outcomes required to operate a materials hoist being a builder's hoist by which only goods or materials and not personnel may be hoisted and where the car, bucket or platform is cantilevered from, and travels up and down externally to, a face of the support structure for licensing purposes.

Application of the Unit

Application of the unit

This unit requires the operator to plan work, conduct routine checks, check controls and operation, conduct hoist operation and shut down and secure hoist.

This unit is based on the requirements of the National Standard for Licensing Persons Performing High Risk Work.

This unit in its current form meets state and territory licensing requirements. Any alteration will result in a unit which is not acceptable to regulators for the purpose of licensing.

Licensing/Regulatory Information

Refer to Unit Descriptor

Pre-Requisites

Prerequisite units Nil

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Prerequisite units Nil

Employability Skills Information

Employability skills This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Plan work.	1.1. Potential workplace ***hazards*** are identified. 1.2. ***Hazard control measures*** are identified consistent with ***appropriate standards*** to ensure the safety of personnel and equipment. 1.3. The ***hoist*** is appropriate to the load/s and workplace conditions. 1.4. The weight of the load is determined according to ***procedures***. 1.5. Appropriate communication methods are identified with appropriate personnel.
2. Conduct routine checks.	2.1. Hoist is visually checked for any damage or detects 2.2. Appropriate ***hazard prevention***/***control measures*** are applied to the work area according to ***procedures***. 2.3. ***Service logbook*** for the hoist is checked for compliance

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ELEMENT	PERFORMANCE CRITERIA
	2.4. ***Routine pre-start operational checks*** are carried out according to procedures. 2.5. Main power supply is switched on. 2.6. Hoist is started according to procedures and checked for any abnormal noises. 2.7. All controls located and checked for serviceability. 2.8. Post start operational checks are carried out according to procedures. 2.9. All ***communication equipment***, lighting and alarm systems are checked for serviceability. 2.10. All hoist ***safety devices*** and functions are tested to their maximum according to procedures. 2.11. All damage and defects are reported and recorded according to procedures and appropriate action taken.
3. Conduct hoist operations.	3.1. Hoist is operated according to procedures. 3.2. Communication methods associated with hoist movement are conducted according to procedures and the appropriate standard. 3.3. Loads and Load distribution are continually monitored to ensure that the hoist is operated within its capacity and according to procedures. 3.4. Hoist movement is monitored constantly ensuring safety to personnel and stability. 3.5. ***Unplanned and/or unsafe*** situations are responded to in line with procedures.
4. Shut down and secure hoist.	4.1. Hoist is ***shut down***, according to procedures. 4.2. All fences and gates are secured according to procedures. 4.3. Routine post -operational checks are carried out according to procedures. 4.4. Power is isolated and secured against unauthorised access. 4.5. All damage and defects are reported and recorded. according to procedures and appropriate action taken.

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Required skills for this unit are:

- accurately record and maintain information relating to materials hoist operations
- communication techniques in the workplace including bells, lights, hand signals intercom and use of two-way radios
- conduct materials hoist operations
- hazards associated with the operation of the materials hoist are identified, risks are assessed and effective hazard prevention/control measures for those hazards identified and put into place
- inspect materials hoist equipment, safety equipment and installation for safe operation
- interpersonal communication skills at a level sufficient to communicate with other site personnel (e.g. receive and interpret work instructions, safety information, emergency procedures)
- verify problems and equipment faults and demonstrate appropriate response procedures.

Required knowledge

Required knowledge for this unit is:

- weight of the load is determined from labels, markings or load paperwork
- level of literacy to be able to read and comprehend manufacturer's instructions, procedures and safety signs
- Commonwealth, state or territory OHS legislation, standards and codes of practice relevant to the full range of processes for the hoist class
- hoist operations and operating techniques
- understanding of the hierarchy of hazard identification and control
- materials safety data sheets and requirements for safe movement of materials
- organisational and workplace standards, requirements, policies and procedures for conducting operations for the hoist class
- procedures for the recording, reporting and maintenance of workplace records and information
- rated capacity and working load limits
- typical routine problems encountered in the operation of a materials hoist, inspection techniques and adjustments required for correction.

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Evidence Guide

EVIDENCE GUIDE

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Overview of assessment	Successful assessment of this unit meets the competency requirement of the National Standard for licensing Persons Performing High Risk Work. State/Territory OHS regulators have mandated the use of Assessment Instruments and Instructions for Assessment for this unit which have been endorsed by the national body responsible for OHS matters.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	A person who demonstrates competency in this unit must be able to provide evidence of the ability to: • comply with OHS licensing legislation. • effectively communicate and work safely with others in the work area. • identify hazards associated with the operation of the hoist and put in place effective hazard prevention/controls • determine load weights. • effectively conduct materials hoist operations to include the tasks of raising and lowering loads with equipment and materials for cantilevered cars, buckets or platforms. • ensure the hoist is attended at all times. • effectively conduct pre operational and shut down checks of the materials hoist (particular awareness of controls, alarms and lockout devices).
Context of and specific resources for assessment	• Assessment of the safe and effective application of knowledge and skill to workplace tasks (performance) must be undertaken using the endorsed Assessment Instrument • Assessment of performance must be undertaken either in the workplace or in a realistically simulated workplace setting • Assessors must ensure that the assessment in the workplace is organised to ensure that all the required equipment and materials and a

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EVIDENCE GUIDE

	suitable working area is made available to suit the assessment and the workplace
	• Assessment must occur under standard and authorised work practices, safety requirements and environmental constraints
	• Assessment is to comply with relevant appropriate standard requirements
	• Applicants must have access to:
	  • personal protective equipment (PPE) for the purpose of the Performance Assessment.
	  • appropriate material hoist and equipment in safe condition
	  • suitable loads as specified by the endorsed assessment instrument
	  • communication equipment (e.g. two-way radios, intercoms, light systems buzzers or bells etc)

Method of assessment	Assessment must be conducted using the endorsed Assessment Instruments. These Instruments provide advice on their application. The use of **'simulators'** in the assessment of this unit of competency is **not acceptable**. Assessment may be in conjunction with the assessment of other units of competency. Assessment methods must confirm consistency and accuracy of performance together with application of underpinning knowledge. Assessment must confirm a reasonable inference that competency is not only able to be satisfied under the particular circumstance, but is able to be transferred to other circumstances.
Guidance information for assessment	Further information about endorsed Assessment Instruments may be obtained from state/territory OHS regulators.

Range Statement

RANGE STATEMENT

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RANGE STATEMENT

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Hazards may include but not limited to:	• ground conditions (e.g. condition of pavement, slopes) • overhead hazards (e.g. power lines, service pipes) • Insufficient lighting • traffic (e.g. pedestrians, vehicles, other plant) • environmental conditions (e.g. wind, lightning, rain) • hoist overload • other specific hazards (e.g. dangerous materials).
Hazard control measures:	Refers to the systematic process of eliminating or reducing the risk to personnel and property through the application of controls. It includes the application of the hierarchy of control, the six-step preference of control measures to manage and control risk: • elimination • substitution • isolation • engineering control measures • using safe work practices • personal protective equipment.
Appropriate standards may include but not limited to:	• codes of practice • legislation • Australian Standards • manufacturer's specifications • industry standard (where applicable).
Hoist may include:	the operation of builder's hoist by which only goods or materials and not personnel may be hoisted and where the car, bucket or platform is cantilevered from, and travels up and down externally to, a face of the support structure.
Procedures may include but are	• manufacturer's guidelines (instructions,

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RANGE STATEMENT

not limited to:	specifications or checklists) • industry operating procedures • workplace procedures (work instructions, operating procedures, checklists).
Communication methods may include but are not limited to:	• verbal and non-verbal language • written instructions • signage • hand signals • listening • questioning to confirm understanding • appropriate worksite protocol • interfloor/ level communications.
Appropriate personnel may include but are not limited to:	• those associated with the operations of the hoist • supervisors • colleagues • managers who are authorised to take responsibility for the workplace or operations.
Hazard prevention/control measures may include but not limited to:	• safety tags on electrical switches/isolators • traffic barricades and control • pedestrian barricades • movement of obstructions • personal protective equipment • hoist safety gates and guards • hoist safety interlocks • adequate illumination.
Service logbook may include but is not limited to:	• any logbook • service book • history record system where the service and maintenance history is kept.
Routine pre start operational checks may include but are not limited to:	• check ground stability • tower ties/guys are secure • power supply is covered by earth leakage protection • power leads are secured above ground level and not attached to scaffolds or building structure • tower guides are clean and free of rust and damage • signage is clearly displayed and legible • brakes and drive mechanism

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RANGE STATEMENT

	• overhead protection • intercom and signalling systems • barriers, fencing and gates • fuels, oil and water (where applicable) • lubrication (grease) • hoist rope • sheaves and anchorage points.
Communication equipment may include but is not limited to:	• fixed channel two-way radios • intercoms • bells • lights • buzzers. **NB**: where radio communication equipment is used the transmitting frequencies of the equipment must be selected to prevent interference to or from other radio equipment being used in the vicinity of the hoist.
Safety devices may include but not limited to:	• emergency braking system • overrun limits • gate interlocks.
Unplanned and/or unsafe situations may include but are not limited to:	• failure/lose of control e.g. power supply, braking system • failure of equipment e.g. hydraulic system, broken hoist cable, damaged drive gear • environmental conditions (e.g. wind, lightning, storms, etc).
Shut Down may include but not limited to:	• position platform at base of tower • power isolated from control panel • mains power supply isolated and secured • fencing/barriers around base secured to prevent unauthorised access • landing gates secured to prevent unauthorised access • key removed from control panel (where applicable).

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Unit Sector(s)

Unit sector Construction

Co-requisite units

Co-requisite units Nil

Functional area

Functional area

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CPCCLRG3001A Licence to perform rigging basic level

Modification History

Not Applicable

Unit Descriptor

Unit descriptor

This unit specifies the outcomes required to perform basic rigging work associated with movement of plant and equipment, steel erections, hoists (including mast climbing hoists), placement of pre-cast concrete, safety nets and static lines, perimeter safety screens and shutters; and cantilever crane loading platforms for licensing purposes.

Application of the Unit

Application of the unit

This unit requires the applicant to be able plan the work, select and inspect equipment, set up task, erect structures and plant and dismantle structures and plant.

This unit is based upon the National Standard for Licensing Persons Performing High Risk Work.

This unit in its current form meets state and territory licensing requirements. Any alteration will result in a unit which is not acceptable to regulators for the purpose of licensing.

This unit has a pre-requisite requirement. This requirement may be met by either the successful completion of the unit *CPCCLDG3001A Licence to perform dogging* or holding a valid licence for dogging.

Licensing/Regulatory Information

Refer to Unit Descriptor

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Pre-Requisites

Prerequisite units

CPCCLDG3001A	Licence to perform dogging

Employability Skills Information

Employability skills This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Plan job.	1.1. Task to be undertaken is assessed. 1.2. Potential workplace ***hazards*** are identified. 1.3. ***Hazard control measures*** are identified consistent with ***appropriate standards*** to ensure the safety of personnel and equipment. 1.4. Site information is obtained. 1.5. All ***forces and loads*** associated with erecting and dismantling ***structures*** and ***associated plant*** are considered in consultation with ***appropriate personnel***. 1.6. ***Rigging equipment*** and ***associated equipment*** are identified in consultation with appropriate personnel according to ***procedures*** and site information.

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ELEMENT	PERFORMANCE CRITERIA
	1.7. *Safety equipment* is identified.
	1.8. Appropriate ***communication methods*** are identified with appropriate personnel.
2. Select and inspect equipment.	2.1. Rigging equipment and associated equipment are selected and inspected according to procedures and the appropriate standard.
	2.2. Safety equipment is selected and inspected according to procedures.
	2.3. All defective rigging equipment, associated equipment and safety equipment is isolated, reported and recorded according to procedures.
	2.4. ***Communication equipment*** is selected and inspected for serviceability (where applicable.
3. Set up task.	3.1. Appropriate ***hazard prevention***/***control measures*** are applied to the work area according to procedures.
	3.2. ***Ground suitability*** is inspected and checked (where appropriate).
	3.3. Site information is reviewed, interpreted and communicated to appropriate personnel and ***appropriate personnel***.
	3.4. All forces and loads associated with erecting and dismantling structures and associated plant are determined in consultation with appropriate personnel.
	3.5. Safety equipment is fitted and worn correctly (where appropriate).
	3.6. Rigging equipment and associated plant are positioned for work application and stability according to procedures.
	3.7. Methods of applying ***temporary connections*** using fibre rope are applied according to procedures and the appropriate standard.
4. Erect structures and plant.	4.1. Structures and associated plant are erected according to procedures and site information.
	4.2. Stability of structures and associated plant is maintained during erection according to procedures.
	4.3. Work is conducted safely at heights including safe and effective use of safety equipment.
	4.4. Appropriate communication methods and communication equipment, are used to co-ordinate the tasks.
	4.5. Associated plant and rigging equipment is used

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ELEMENT	PERFORMANCE CRITERIA
	according to procedures and the appropriate standard. 4.6. Temporary guys, ties, propping and shoring, including ***flexible steel wire rope***, and tubing, are connected where required. 4.7. Associated equipment is used in a safe and appropriate manner. 4.8. The completed task is inspected according to the appropriate standard. 4.9. Excess materials are removed from the work area (where applicable).
5. Dismantle structures and plant.	5.1. Structures and associated plant are dismantled according to procedures and the appropriate standard. 5.2. Work is conducted safely at heights including safe and effective use of safety equipment. 5.3. Stability of structures and associated plant is maintained during dismantling according to procedures. 5.4. Rigging equipment, associated equipment, safety equipment and associated plant are inspected for damage and defects. 5.5. All defective rigging equipment, associated equipment, associated plant and safety equipment are isolated reported and recorded according to procedures. 5.6. Rigging equipment and associated equipment are stored. according to procedures and the appropriate standard. 5.7. Hazard prevention/control measures are removed (where appropriate).

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

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REQUIRED SKILLS AND KNOWLEDGE

Required skills for this unit are:

- ability to calculate Safe Working Load (SWL) and Working Load Limit (WLL)
- ability to erect and dismantle, level, plumb and stabilise associated plant and structures
- ability to work safely at heights including the correct application of safety equipment.
- accurate interpretation of basic structural charts and structural plans (site information)
- applying methods for making temporary connections of ropes using fibre and synthetic types
- apply methods of splicing and whipping fibre and synthetic ropes
- correct application and use of all rigging and associated equipment
- risk assessment and hazard control strategies
- interpersonal and communication skills at a level sufficient to site/workplace requirements. This includes the relevant communication methods and equipment.
- verify problems and equipment faults and demonstrate appropriate response.

Required knowledge

Required knowledge for this unit is:

- appropriate mathematical procedures for estimation and measurement of loads
- ability to interpret manufacturer's specifications for all plant and equipment use in rigging operations
- knowledge of principles relating to all plant, equipment and structural stability
- knowledge of the types and functions of rigging, safety and associated equipment including an understanding of their limitations.
- organisational and workplace standards, requirements, policies and procedures for rigging
- understanding of the hierarchy of hazard identification and control
- relevant Commonwealth, state or territory and local government OHS legislation, standards and codes of practice for undertaking rigging activities
- understanding of inspection and maintenance requirements of a wide range of appropriate plant and equipment in line with Australian Standards or manufacturer's specifications
- estimation of ground bearing pressures of the full range of soil types and associated ground conditions for setting up plant and equipment.

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Evidence Guide

EVIDENCE GUIDE

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Overview of assessment

Successful assessment of this unit meets the competency requirement of the National Standard for licensing Persons Performing High Risk Work.

State/Territory OHS regulators have mandated the use of Assessment Instruments and Instructions for Assessment endorsed by the national body responsible for OHS matters for the assessment of this unit.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

A person who demonstrates competency in this unit must be able to provide evidence of the ability to:

- comply with OHS licensing legislation.
- effectively communicate and work safely with others in the work area.
- effectively conduct risk assessment and management procedures.
- effectively complete the following tasks:-
  - inspection of all plant and equipment, and
  - installation of a fall arrest system (Static line), and
  - use of a safety harness / fall arrest system, and
  - installation of crane loading platforms and
  - installation of a safety net, and
  - installation of a shutter and safety screen, and
  - demonstrated ability to work safely at heights, and
  - erection of structural steel, and
  - erection of precast panel, and
  - set up and operation of a winch for load movement, and
  - installation of a materials hoist, or
  - installation of a mast climber.
- effectively demonstrate the following knots,

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	bends and hitches:- • Sheet bend, • Becket hitch, • Running bowline, • Double bowline. • effectively demonstrate the following splices and whippings:- • Eye splice, • Back splice, • Short splice, • Sail makers whipping, • Common whipping, • West countryman's
Context of and specific resources for assessment	Assessment of the safe and effective application of knowledge and skill to workplace tasks (performance) must be undertaken using the National OHS endorsed Assessment Instrument. Assessment of performance must be undertaken either in the workplace or in a realistically simulated workplace setting. Assessors must ensure that the assessment in the workplace is organised to ensure that all the required equipment and materials and a suitable working area is made available to suit the assessment and the workplace. Assessment must occur under standard and authorised work practices, safety requirements and environmental constraints. Assessment is to comply with the requirements of any relevant Standards or operating procedures for basic rigging. Applicants must have access to: • personal protective equipment (PPE) for the purpose of the Performance Assessment. • appropriate safety equipment in safe condition • appropriate rigging equipment, associated equipment associated plant in safe condition as described in the endorsed assessment instrument • communication equipment (e.g. two-way

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	radios) where applicable • appropriate materials as required for safe erection of structures • appropriate materials for conducting fibre rope slicing, whipping, knots, bends and hitches.
Method of assessment	Assessment must be conducted using the national OHS endorsed Assessment Instruments. These Instruments provide advice on their application. The use of **'simulators'** in the assessment of this unit of competency is **not acceptable**. Assessment may be in conjunction with the assessment of other units of competency. Assessment methods must confirm consistency and accuracy of performance together with application of underpinning knowledge. Assessment must confirm a reasonable inference that competency is not only able to be satisfied under the particular circumstance, but is able to be transferred to other circumstances.
Guidance information for assessment	Further information about endorsed Assessment Instruments may be obtained from state/territory OHS regulators.

Range Statement

RANGE STATEMENT

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Hazards may include but are not limited to:	• ground stability (e.g. ground condition, recently filled trenches, slopes) • overhead hazards (e.g. power lines, service pipes) (**NB**: minimum clearance distance from powerlines or electrical equipment as determined by relevant state authority or

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RANGE STATEMENT

	electrical supply authority.) • traffic (e.g. pedestrians, vehicles, other plant) • insufficient lighting • environmental conditions (e.g. wind, lightning, storms) • other specific hazards (e.g. dangerous materials).
Hazard control measures:	Refers to the systematic process of eliminating or reducing the risk to personnel and property through the application of controls. It includes the application of the hierarchy of control, the six-step preference of control measures to manage and control risk: • elimination • substitution • isolation • engineering control measures • using safe work practices • personal protective equipment.
Appropriate standards may include:	• codes of practice • legislation • Australian Standards • manufacturer's specifications • industry standards (where applicable).
Site Information may include, but not limited to:	• local conditions such as access and egress, • work method statements, • site specific job safety analyses and other site specific documentation as required. • task plans / Schedules and structural plans.
Forces and Loads may include, but not limited to:	• dead loads • live loads • static load • dynamic loads • wind loads.
Structures may include but are not limited to:	• structural steel • precast panels.
Associated plant may include but not limited to:	• static lines • safety nets • hoists

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RANGE STATEMENT

	• mast climbers • loading platforms.
Appropriate personnel may include:	• engineers • supervisors • colleagues • managers who are authorised to take responsibility for the workplace or operations.

Rigging Equipment may include but is not limited to:	• scaffolds
	• elevated work platforms
	• personnel box
	• cantilevered crane loading platforms
	• mast climbers.
	• safety screens and shutters
	• cranes including but not limited to:
	  • non-slewing cranes
	  • mobile slewing cranes
	  • vehicle loading cranes
	  • tower cranes
	  • self-erecting tower cranes
	  • portal boom cranes
	  • derrick cranes
	  • bridge and gantry cranes.

Associated equipment may include but is not limited to:	• all types of power and manually operated lifting gear • fibre ropes • flexible steel wire rope (FSWR) • chains • wire and synthetic slings • shackles • terminations • wedge sockets • eye bolts • beam clamps • plate clamps • rope grips • turnbuckles • rigging screws • chain blocks • lever blocks • lever-action winches

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RANGE STATEMENT

	• sheaves • spreader bars • lifting beams • jacks • levers • skates • wedges • rollers • girder trolley
Procedures may include but is not limited to:	• manufacturer's guidelines (instructions, specifications or checklists) • industry operating procedures, relevant codes of practice • workplace procedures (work instructions, operating procedures, checklists).
Safety Equipment may include but not limited to:	• safety harness • energy absorber • lanyard • inertia reel • static safety lines • safety nets.
Communication Methods may include but is not limited to:	• verbal and non-verbal language • written instructions • signage • hand signals • listening, • questioning to confirm understanding, and appropriate worksite protocol. **NB**: Mobile phones are not to be used for signalling purposes during the rigging process.
Communication equipment may include but is not limited to:	• fixed channel two-way radios
Hazard prevention/control measures may include but is not limited to:	• safety tags on electrical switches/isolators • powerlines are insulated • safety observer used inside exclusion zone • power disconnected • traffic barricades and control • pedestrian barricades • trench covers

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RANGE STATEMENT

	• movement of obstructions • personal protective equipment • adequate illumination • safety shutters and screens.
Ground suitability may include but is not limited to:	• rough uneven ground • backfilled ground • soft soils • hard compacted soil • rock • bitumen • concrete • suspended concrete floors • building roofs • landings • ground bearing pressure.
Appropriate personnel may include but not limited to	• other riggers • doggers • crane operators.
Temporary connections may include but not limited to:	• knots • bends • hitches • spicing • whipping.
Flexible Steel Wire Rope (***FSWR***) includes:	• identification, uses and connections. May include termination for: • static lines, • guys, • purchase systems, • lashing, • cranes, • hoist and winch ropes.

Unit Sector(s)

Unit sector Construction

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Co-requisite units

Co-requisite units Nil

Functional area

Functional area

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CPCCLRG3002A Licence to perform rigging intermediate level

Modification History

Not Applicable

Unit Descriptor

Unit descriptor

This unit specifies the outcomes required to perform rigging work at the intermediate level, which includes all the outcomes for rigging work at the basic level, and also includes rigging of cranes, rigging of conveyors, rigging of dredges and excavators, rigging associated with tilt slabs, rigging associated with demolition work, and dual lifts for licensing purposes.

Application of the Unit

Application of the unit

This unit requires the applicant to be able plan the work, select and inspect equipment, set up task, erect structures and plant and dismantle structures and plant.

This unit is based upon the National Standard for Licensing Persons Performing High Risk Work.

This unit in its current form meets state and territory licensing requirements. Any alteration will result in a unit which is not acceptable to regulators for the purpose of licensing.

This unit has a pre-requisite requirement. This requirement may be met by either the successful completion of the unit *CPCCLRG3001A Licence to perform rigging basic level* or holding a valid licence for basic rigging.

Licensing/Regulatory Information

Refer to Unit Descriptor

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Pre-Requisites

Prerequisite units

CPCCLRG3001A	Licence to perform rigging basic level

Employability Skills Information

Employability skills This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Plan job.	1.1. Task to be undertaken is assessed 1.2. Potential workplace ***hazards*** are identified 1.3. ***Hazard control measures*** are identified consistent with ***appropriate standards*** to ensure the safety of personnel and equipment 1.4. Site information is obtained 1.5. All ***forces and loads*** associated with erecting and dismantling ***structures*** and ***associated plant*** are considered in consultation with ***appropriate personnel***. 1.6. ***Rigging equipment*** and ***associated equipment*** are identified in consultation with appropriate personnel

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ELEMENT	PERFORMANCE CRITERIA
	according to ***procedures*** and site information.
	1.7. *Safety equipment* is identified.
	1.8. Appropriate ***communication methods*** are identified with appropriate personnel.
2. Select and inspect equipment.	2.1. Rigging equipment and associated equipment are selected and inspected according to procedures and the appropriate standard.
	2.2. Safety equipment is selected and inspected according to procedures.
	2.3. All defective rigging equipment, associated equipment and safety equipment is isolated, reported and recorded according to procedures.
	2.4. ***Communication equipment*** is selected and inspected for serviceability (where applicable)
3. Set up tasks.	3.1. Appropriate ***hazard prevention***/***control measures*** are applied to the work area according to procedures.
	3.2. ***Ground suitability*** is inspected and checked (where appropriate).
	3.3. Site information is reviewed, interpreted and communicated to appropriate personnel and ***appropriate personnel***.
	3.4. All forces and loads associated with erecting and dismantling structures and associated plant are determined in consultation with appropriate personnel.
	3.5. Safety equipment is fitted and worn correctly (where appropriate).
	3.6. Rigging equipment and associated plant are positioned for work application and stability according to procedures.
4. Erect structures and plant.	4.1. Structures and associated plant is erected according to procedures and site information.
	4.2. Stability of structures and associated plant is maintained during erection according to procedures.
	4.3. Work is conducted safely at heights including safe and effective use of safety equipment.
	4.4. Appropriate communication methods and communication equipment, are used to co-ordinate the tasks.
	4.5. Temporary guys, ties, propping and shoring, including ***flexible steel wire rope***, and tubing, are connected where required.

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ELEMENT	PERFORMANCE CRITERIA
	4.6. Associated plant and rigging equipment is used according to procedures and the appropriate standard. 4.7. Associated equipment is used in a safe and appropriate manner. 4.8. The completed task is inspected according to the appropriate standard. 4.9. Excess materials are removed from the work area (where applicable)
5. Dismantle structures and plant.	5.1. Structures and associated plant are dismantled according to procedures and the appropriate standard. 5.2. Work is conducted safely at heights including safe and effective use of safety equipment. 5.3. Stability of structures and associated plant is maintained during dismantling according to procedures. 5.4. Rigging equipment, associated equipment, safety equipment and associated plant are inspected for damage and defects 5.5. All defective rigging equipment, associated equipment, associated plant and safety equipment are isolated reported and recorded according to procedures. 5.6. Rigging equipment and associated equipment are stored according to procedures and the appropriate standard. 5.7. Hazard prevention/control measures are removed (where appropriate)

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Required skills for this unit are:

- ability to calculate Safe Working Load (SWL) and Working Load Limit (WLL)

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REQUIRED SKILLS AND KNOWLEDGE

- ability to erect and dismantle, level, plumb and stabilise associated plant and structures
- ability to work safely at heights including the correct application of safety equipment.
- accurate interpretation of structural charts and structural plans (site information)
- correct application and use of all rigging and associated equipment
- risk assessment and hazard control strategies
- interpersonal and communication skills at a level sufficient to site/workplace requirements. This includes the relevant communication methods and equipment.
- verify problems and equipment faults and demonstrate appropriate response.

Required knowledge

Required knowledge for this unit is:

- appropriate mathematical procedures for estimation and measurement of loads
- ability to interpret manufacturer's specifications for all plant and equipment use in rigging operations
- knowledge of principles relating to all plant, equipment and structural stability
- knowledge of the types and functions of rigging, safety and associated equipment including an understanding of their limitations
- organisational and workplace standards, requirements, policies and procedures for rigging
- understanding of the hierarchy of hazard identification and control
- relevant Commonwealth, state or territory and local government OHS legislation, standards and codes of practice for undertaking rigging activities
- understanding of inspection and maintenance requirements of a wide range of appropriate plant and equipment in line with Australian Standards or manufacturer's specifications
- estimation of ground bearing pressures of the full range of soil types and associated ground conditions for setting up plant and equipment.

Evidence Guide

EVIDENCE GUIDE

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Overview of assessment	Successful assessment of this unit meets the competency requirement of the National Standard

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EVIDENCE GUIDE

	for licensing Persons Performing High Risk Work. State/Territory OHS regulators have mandated the use of Assessment Instruments and Instructions for Assessment for this unit which have been endorsed by the national body responsible for OHS matters.

Critical aspects for assessment and evidence required to demonstrate competency in this unit	A person who demonstrates competency in this unit must be able to provide evidence of the ability to:
	• comply with OHS licensing legislation.
	• effectively communicate and work safely with others in the work area.
	• effectively conduct risk assessment and management procedures.
	• effectively complete the following tasks:
	  • adding and removing a tower crane section, or
	  • adding and removing a crane lattice boom section, or
	  • erecting a non guyed tower (e.g. light tower, and
	  • perform a multiple crane lift, or
	  • a multiple winch lift, or
	  • a combination of a crane and winch lift, and
	  • lifting and installing a series of tilt-up panels, or
	  • lifting and installing a series of scenery panels (i.e. entertainment industry), and
	  • demolish/remove a series of tilt-up panel structures, or
	  • demolish/remove a series of scenery panel structures, and
	  • demolishing a concrete encased structural steel column and beam.
	• **NB**: All specifications for these performance tasks are detailed in the endorsed assessment instrument.
	• effectively conduct pre and post operational checks of intermediate rigging equipment.

Context of and specific resources for assessment	Assessment of the safe and effective application of knowledge and skill to workplace tasks (performance) must be undertaken using the

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EVIDENCE GUIDE

	endorsed Assessment Instrument. Assessment of performance must be undertaken either in the workplace or in a realistically simulated workplace setting. Assessors must ensure that the assessment in the workplace is organised to ensure that all the required equipment and materials and a suitable working area is made available to suit the assessment and the workplace. Assessment must occur under standard and authorised work practices, safety requirements and environmental constraints. Assessment is to comply with relevant appropriate standard requirements. Applicants must have access to: • personal protective equipment (PPE) for the purpose of the Performance Assessment • appropriate safety equipment is safe condition • appropriate rigging equipment, associated equipment associated plant in safe condition as described in the endorsed assessment instrument • communication equipment (e.g. radios) where applicable • appropriate materials as required for safe erection of structures.
Method of assessment	Assessment must be conducted using the endorsed Assessment Instruments. These Instruments provide advice on their application. The use of **'simulators'** in the assessment of this unit of competency is **not acceptable**. Assessment may be in conjunction with the assessment of other units of competency. Assessment methods must confirm consistency and accuracy of performance together with application of underpinning knowledge. Assessment must confirm a reasonable inference that competency is not only able to be satisfied under the particular circumstance, but is able to be transferred to other circumstances.

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EVIDENCE GUIDE

Guidance information for assessment	Further information about endorsed Assessment Instruments may be obtained from state/territory OHS regulators.

Range Statement

RANGE STATEMENT

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Hazards may include but not limited to:	• ground stability (e.g. ground condition, recently filled trenches, slopes) • overhead hazards (e.g. power lines, service pipes) (**NB**: Minimum clearance distance from powerlines or electrical equipment as determined by relevant state authority or electrical supply authority) • traffic (e.g. pedestrians, vehicles, other plant) • insufficient lighting • environmental conditions (e.g. wind, lightning, storms) • other specific hazards (e.g. dangerous materials).
Hazard control measures:	Refers to the systematic process of eliminating or reducing the risk to personnel and property through the application of controls. It includes the application of the hierarchy of control, the six-step preference of control measures to manage and control risk: • elimination • substitution • isolation • engineering control measures • using safe work practices • personal protective equipment.

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RANGE STATEMENT

Appropriate standards may include but are not limited to:	• codes of practice • legislation • Australian Standards • manufacturer's specifications • industry standards (where applicable).
Site Information may include but is not limited to:	• local conditions such as access and egress • work method statements • site-specific job safety analyses and other site specific documentation as required • task plans /schedules and structural plans.
Forces and Loads may include but are not limited to:	• dead loads • live loads • static load • dynamic loads • wind loads.
Structures may include but not limited to:	• concrete tilt-up panels • scenery panels (used in entertainment) • non guyed light towers.
Associated plant may include but is not limited to:	• all types of cranes • conveyors • dredges • excavators.
Appropriate personnel may include but not limited to:	• supervisors • engineers • colleagues • managers who are authorised to take responsibility for the workplace or operations.

Rigging Equipment may include but is not limited to:	• scaffolds
	• elevated work platforms
	• stages
	• personnel box
	• cantilevered crane loading platforms,
	• mast climbers
	• safety screens and shutters
	• cranes including but not limited to:
	  • non-slewing cranes
	  • mobile slewing cranes
	  • vehicle loading cranes
	  • tower cranes

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RANGE STATEMENT

	• self-erecting tower cranes • portal boom cranes • derrick cranes • bridge and gantry cranes.
Associated equipment may include but is not limited to:	• all associated equipment at the basic rigging level, and • lifting clutches (swift lifts) • chain motors.
Procedures may include but are not limited to:	• manufacturer's guidelines (instructions, specifications or checklists) • industry operating procedures, relevant codes of practice • workplace procedures (work instructions, operating procedures, checklists).
Safety Equipment may include but not limited to:	• safety harness • energy absorber • lanyard • inertia reel • safety nets • static lines.
Communication Methods may include but not limited to:	• verbal and non-verbal language • written instructions • signage • hand signals • listening, • questioning to confirm understanding, and appropriate worksite protocol. **NB**: Mobile phones are not to be used for signalling purposes during the rigging process.
Communication equipment may include but is not limited to:	• fixed channel two-way radios
Hazard prevention/control measures may include but is not limited to:	• safety tags on electrical switches/isolators • powerlines are insulated • safety observer used inside exclusion zone • power disconnected • traffic barricades and control • pedestrian barricades • trench covers • movement of obstructions

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RANGE STATEMENT

	• personal protective equipment • adequate illumination.
Ground suitability may include but is not limited to:	• rough uneven ground • backfilled ground • soft soils • hard compacted soil • rock • bitumen • concrete • suspended concrete floors • building roofs • landings • ground bearing pressure.
Appropriate personnel may include but not limited to:	• other riggers • doggers • crane operators.
Flexible Steel Wire Rope (***FSWR***) includes:	• identification, uses and connections. May include termination for: • static lines • guys • purchase systems • lashing • cranes • hoist and winch ropes.

Unit Sector(s)

Unit sector Construction

Co-requisite units

Co-requisite units Nil

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Functional area

Functional area

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CPCCLRG4001A Licence to perform rigging advanced level

Modification History

Not Applicable

Unit Descriptor

Unit descriptor

This unit specifies the outcomes required to perform rigging work at the advanced level, which includes all the outcomes for rigging work at the basic and intermediate levels, and also includes rigging of gin poles and shear legs, flying foxes and cable ways, guyed derricks and structures, and suspended scaffolds and fabricated hung scaffolds for licensing purposes.

Application of the Unit

Application of the unit

This unit requires the applicant to be able plan the work, select and inspect equipment, set up task, erect structures and plant and dismantle structures and plant.

This unit is based upon the National Standard for Licensing Persons Performing High Risk Work.

This unit in its current form meets state and territory licensing requirements. Any alteration will result in a unit which is not acceptable to regulators for the purpose of licensing.

This unit has a pre-requisite requirement. This requirement may be met by either the successful completion of the unit *CPCCLRG3002A Licence to perform rigging intermediate level* or holding a valid licence for intermediate rigging.

Licensing/Regulatory Information

Refer to Unit Descriptor

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Pre-Requisites

Prerequisite units

CPCCLRG3002A	Licence to perform rigging intermediate level

Employability Skills Information

Employability skills This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Plan job.	1.1. Task to be undertaken is assessed. 1.2. Potential workplace ***hazards*** are identified. 1.3. ***Hazard control measures*** are identified consistent with ***appropriate standards*** to ensure the safety of personnel and equipment. 1.4. Site information is obtained. 1.5. All ***forces and loads*** associated with erecting and dismantling ***associated plant*** are considered in consultation with ***appropriate personnel***. 1.6. ***Rigging equipment*** and ***associated equipment*** are identified in consultation with appropriate personnel according to ***procedures*** and site information.

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ELEMENT	PERFORMANCE CRITERIA
	1.7. ***Safety equipment*** is identified. 1.8. Appropriate communication methods are identified with appropriate personnel.
2. Select and inspect equipment.	2.1. Rigging equipment and associated equipment are selected and inspected according to procedures and the appropriate standard. 2.2. Safety equipment is selected and inspected according to procedures. 2.3. All defective rigging equipment, associated equipment and safety equipment is isolated, reported and recorded according to procedures. 2.4. ***Communication equipment*** is selected and inspected for serviceability (where applicable)
3. Prepare site and equipment.	3.1. Appropriate ***hazard prevention***/***control measures*** are applied to the work area according to procedures. 3.2. ***Ground suitability*** is inspected and checked (where appropriate). 3.3. Site information is reviewed interpreted and communicated to appropriate personnel and appropriate personnel. 3.4. All forces and loads associated with erecting and dismantling associated plant are determined in consultation with appropriate personnel. 3.5. Safety equipment is fitted and worn correctly (where appropriate). 3.6. Rigging equipment and associated plant are positioned for work application and stability according to procedures. 3.7. Methods of applying ***temporary connections*** using fibre rope are applied according to procedures and the appropriate standard.
4. Erect structures and plant.	4.1. Associated plant is erected according to procedures and site information. 4.2. Stability of associated plant is maintained during erection according to procedures. 4.3. Work is conducted safely at heights including safe and effective use of safety equipment. 4.4. Appropriate communication methods and communication equipment, are used to co-ordinate the tasks. 4.5. Temporary guys, ties, propping and shoring, including ***flexible steel wire rope***, and tubing, are

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ELEMENT	PERFORMANCE CRITERIA
	connected where required. 4.6. Associated plant and rigging equipment is used according to procedures and the appropriate standard. 4.7. Associated equipment is used in a safe and appropriate manner. 4.8. The completed task is inspected according to the appropriate standard. 4.9. Excess materials are removed from the work area (where applicable)
5. Dismantle structures and plant.	5.1. Associated plant is dismantled according to procedures and the appropriate standard. 5.2. Work is conducted safely at heights including safe and effective use of safety equipment. 5.3. Stability of associated plant is maintained during dismantling according to procedures. 5.4. Rigging equipment, associated equipment, safety equipment and associated plant are inspected for damage and defects 5.5. All defective rigging equipment, associated equipment, associated plant and safety equipment are isolated reported and recorded according to procedures. 5.6. Rigging equipment and associated equipment are stored according to procedures and the appropriate standard. 5.7. Hazard prevention/control measures are removed (where appropriate)

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Required skills for this unit are:

- ability to calculate Safe Working Load (SWL) and Working Load Limit (WLL)
- ability to erect and dismantle, level, plumb and stabilise associated plant

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REQUIRED SKILLS AND KNOWLEDGE

- ability to work safely at heights including the correct application of safety equipment.
- accurate interpretation of structural charts and structural plans (Site information)
- applying methods for making temporary connections of ropes using fibre and synthetic types
- correct application and use of all rigging and associated equipment
- risk assessment and hazard control strategies
- interpersonal and communication skills at a level sufficient to site/workplace requirements. This includes the relevant communication methods and equipment.
- verify problems and equipment faults and demonstrate appropriate response.

Required knowledge

Required knowledge for this unit is:

- appropriate mathematical procedures for estimation and measurement of loads
- ability to interpret manufacturer's specifications for all plant and equipment use in rigging operations
- knowledge of principles relating to all plant, equipment and structural stability
- knowledge of the types and functions of rigging, safety and associated equipment including an understanding of their limitations
- organisational and workplace standards, requirements, policies and procedures for rigging
- understanding of the hierarchy of hazard identification and control
- relevant Commonwealth, state or territory and local government OHS legislation, standards and codes of practice for undertaking rigging activities
- understanding of inspection and maintenance requirements of a wide range of appropriate plant and equipment in line with Australian Standards or manufacturer's specifications
- estimation of ground bearing pressures of the full range of soil types and associated ground conditions for setting up plant and equipment.

Evidence Guide

EVIDENCE GUIDE

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Overview of assessment	Successful assessment of this unit meets the competency requirement of the National Standard

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EVIDENCE GUIDE

	for licensing Persons Performing High Risk Work. State/Territory OHS regulators have mandated the use of Assessment Instruments and Instructions for Assessment for this unit which have been endorsed by the national body responsible for OHS matters

Critical aspects for assessment and evidence required to demonstrate competency in this unit	A person who demonstrates competency in this unit must be able to provide evidence of the ability to:
	• comply with OHS licensing legislation.
	• effectively communicate and work safely with others in the work area.
	• effectively conduct risk assessment and management procedures.
	• effectively complete the following tasks:
	  • rig a span rope, or
	  • rig a flying fox, and
	  • install a swinging stage, or
	  • install a bosuns chair, and
	  • set up a gin pole and conduct a lift with a powered winch, and
	  • erect and dismantle a hung or suspended scaffold
	
	NB: All specifications for these performance tasks are detailed in the endorsed assessment instrument.
	• effectively demonstrate the following knots, bends and hitches:
	  • Alpine hitch
	  • Bosun chair hitch
	  • Prusik hitch
	  • Figure eight
	• effectively conduct pre and post operational checks of advanced rigging equipment.

Context of and specific resources for assessment	Assessment of the safe and effective application of knowledge and skill to workplace tasks (performance) must be undertaken using the endorsed Assessment Instrument. Assessment of performance must be undertaken either in the workplace or in a realistically

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	simulated workplace setting. Assessors must ensure that the assessment in the workplace is organised to ensure that all the required equipment and materials and a suitable working area is made available to suit the assessment and the workplace. Assessment must occur under standard and authorised work practices, safety requirements and environmental constraints. Assessment is to comply with relevant appropriate standard requirements. Applicants must have access to: • personal protective equipment (PPE) for the purpose of the Performance Assessment • appropriate safety equipment is safe condition • Appropriate rigging equipment, associated equipment associated plant in safe condition as described in the endorsed assessment instrument • communication equipment (e.g. radios) where applicable • appropriate materials as required for safe erection and dismantling of performance tasks • appropriate materials for conducting fibre rope knots, bends and hitches.
Method of assessment	Assessment must be conducted using the endorsed Assessment Instruments. These Instruments provide advice on their application. The use of **'simulators'** in the assessment of this unit of competency is **not acceptable**. Assessment may be in conjunction with the assessment of other units of competency. Assessment methods must confirm consistency and accuracy of performance together with application of underpinning knowledge. Assessment must confirm a reasonable inference that competency is not only able to be satisfied under the particular circumstance, but is able to be transferred to other circumstances.
Guidance information for	Further information about endorsed Assessment

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assessment	Instruments may be obtained from state/territory OHS regulators.

Range Statement

RANGE STATEMENT

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Hazards may include but are not limited to:	• ground stability (e.g. ground condition, recently filled trenches, slopes) • overhead hazards (e.g. power lines, service pipes) (**NB**: Minimum clearance distance from powerlines or electrical equipment as determined by relevant state authority or electrical supply authority) • traffic (e.g. pedestrians, vehicles, other plant) • insufficient lighting • environmental conditions (e.g. wind, lightning, storms) • other specific hazards (e.g. dangerous materials).
Hazard control measures:	Refers to the systematic process of eliminating or reducing the risk to personnel and property through the application of controls. It includes the application of the hierarchy of control, the six-step preference of control measures to manage and control risk: • elimination • substitution • isolation • engineering control measures • using safe work practices • personal protective equipment.
Appropriate standards may	• codes of practice

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RANGE STATEMENT

include:	• legislation • Australian Standards • manufacturer's specifications • industry standards (where applicable).
Site information may include but is not limited to:	• local conditions such as access and egress • work method statements • site-specific job safety analyses and other site specific documentation as required • task plans /schedules and structural plans.
Forces and loads may include but are not limited to:	• dead loads • live loads • static load • dynamic loads • wind loads.
Associated plant may include but is not limited to:	• gin poles • flying foxes • shear legs • cable ways • guyed derricks • structures, and • suspended scaffolds • fabricated hung scaffolds.
Appropriate personnel may include but not limited to:	• engineers • supervisors • colleagues • managers who are authorised to take responsibility for the workplace or operations.

Rigging equipment may include but is not limited to:	• scaffolds
	• elevated work platforms
	• stages
	• personnel box
	• cantilevered crane loading platforms
	• mast climbers
	• safety screens and shutters
	• cranes including but not limited to:
	  • non-slewing cranes
	  • mobile slewing cranes
	  • vehicle loading cranes
	  • tower cranes
	  • self-erecting tower cranes

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RANGE STATEMENT

	• portal boom cranes • derrick cranes • bridge and gantry.
Associated equipment may include but not limited to:	• all associated equipment at the basic and intermediate rigging level.
Procedures may include but not limited to:	• manufacturer's guidelines (instructions, specifications or checklists) • industry operating procedures, relevant codes of practice • workplace procedures (work instructions, operating procedures, checklists).
Safety equipment may include but not limited to:	• safety harness • energy absorber • lanyard • inertia reel • safety nets • static lines.
Communication methods may include but are not limited to:	• verbal and non-verbal language • written instructions • signage • hand signals • listening • questioning to confirm understanding • appropriate worksite protocol. **NB**: Mobile phones are not to be used for signalling purposes during the rigging process.
Appropriate personnel may include but are not limited to:	• other riggers • doggers • crane operators.
Communication equipment may include but is not limited to:	• fixed channel two-way radios.
Hazard prevention/control measures may include but are not limited to:	• safety tags on electrical switches/isolators • powerlines are insulated • safety observer used inside exclusion zone • power disconnected • traffic barricades and control • pedestrian barricades • trench covers

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RANGE STATEMENT

	• movement of obstructions • personal protective equipment • adequate illumination.
Ground suitability may include but not limited to:	• rough uneven ground • backfilled ground • soft soils • hard compacted soil • rock • bitumen • concrete • suspended concrete floors • building roofs • landings • ground bearing pressure.
Temporary connections may include but not limited to:	• knots • bends • hitches • whipping.
Flexible Steel Wire Rope (***FSWR***) ***includes***:	• identification, uses and connections. May include termination for: • static lines • guys • purchase systems • lashing • cranes • hoist and winch ropes.

Unit Sector(s)

Unit sector Construction

Co-requisite units

Co-requisite units Nil

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Co-requisite units Nil

Functional area

Functional area

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CPCCLSF2001A Licence to erect, alter and dismantle scaffolding basic level

Modification History

Not Applicable

Unit Descriptor

Unit descriptor This unit specifies the outcomes required to erect, alter and dismantle scaffolding at the basic level, consisting of scaffolding work connected with the operation or use of modular or pre-fabricated scaffolds, cantilevered materials hoists with a maximum working load of 500kg, ropes and gin wheels, safety nets and static lines, and bracket scaffolds (tank and formwork) for licensing purposes.

Application of the Unit

Application of the unit This unit covers the scope of work to plan the job, select and inspect equipment, set up task, erect scaffold and scaffold equipment and dismantle scaffold and scaffold equipment.

This unit is based upon the National Standard for Licensing Persons Performing High Risk Work.

This unit in its current form it state and territory licensing requirements. Any alteration will result in a unit which is not acceptable to regulators for the purpose of licensing.

Licensing/Regulatory Information

Refer to Unit Descriptor

Pre-Requisites

Prerequisite units Nil

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Prerequisite units Nil

Employability Skills Information

Employability skills This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Plan job.	1.1. Task to be undertaken is assessed. 1.2. Potential workplace ***hazards*** are identified. 1.3. ***Hazard control measures*** are identified consistent with ***appropriate standards*** to ensure the safety of personnel and equipment. 1.4. Site information is obtained. 1.5. ***Scaffold***, ***associated equipment*** and ***scaffolding equipment*** are identified from site information and in consultation with ***appropriate personnel*** (where applicable). 1.6. ***Safety equipment*** is identified. 1.7. All ***forces and loads*** exerted on and by the scaffold and/or scaffolding equipment are determined and calculated. 1.8. Appropriate ***communication methods*** are identified

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ELEMENT	PERFORMANCE CRITERIA
	with appropriate personnel.
2. Select and inspect plant and equipment.	2.1. Scaffold, associated equipment and scaffold equipment are selected and inspected according to ***procedures*** and site information. 2.2. Safety equipment is selected and inspected according to procedures. 2.3. All defective Scaffold, associated equipment, scaffold equipment and safety equipment are isolated according to procedures. 2.4. All defective Scaffold, associated equipment, scaffold equipment and safety equipment are reported and recorded according to procedures. 2.5. ***Communication equipment*** is selected and inspected for serviceability (where applicable).
3. Set up task	3.1. Appropriate ***hazard prevention***/***control measures*** are applied to the work area according to procedures. 3.2. Ground suitability is checked. 3.3. Appropriate footings are prepared to support scaffold and scaffold equipment according to procedures and the appropriate standard. 3.4. Scaffold and scaffold equipment are prepared for erection according to procedures and the appropriate standard. 3.5. Safety equipment is fitted and secured according to procedures (where applicable). 3.6. Scaffold and scaffold equipment are positioned for work application and ***stability*** according to procedures and the appropriate standard.
4. Erect scaffold and scaffold equipment.	4.1. Scaffold and scaffold equipment are erected according to procedures and the appropriate standard. 4.2. Work is conducted safely at heights including safe and effective use of safety equipment. 4.3. Scaffold and scaffold equipment are erected consistent with site information. 4.4. Appropriate communication methods are used to coordinate the tasks. 4.5. Completed tasks are inspected for compliance with the appropriate standard. 4.6. Handover certificate is completed as required and handed to appropriate personnel. 4.7. Excess materials from the work area are removed

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ELEMENT	PERFORMANCE CRITERIA
	(where applicable).
5. Dismantle scaffold and scaffold equipment.	5.1. Scaffold and scaffold equipment are dismantled according to procedures and the appropriate standard. 5.2. Work is conducted safely at heights including safe and effective use of safety equipment. 5.3. Scaffold, associated equipment and scaffold equipment are inspected for damage and defects. 5.4. All damaged and defective scaffold, associated equipment and scaffold equipment are tagged and isolated according to procedures. 5.5. Hazard prevention/control measures are removed (where appropriate). 5.6. All damaged and defective scaffold, associated equipment and scaffold equipment are reported and recorded according to procedures and appropriate action taken.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Required skills for this unit are:

- ability to calculate Safe Working Load (SWL) and Working Load Limit (WLL)
- ability to erect scaffold within the scope of the basic scaffolder
- ability to erect, level, plumb and stabilise cantilever hoists and scaffolds
- ability to interpret manufacturer's specifications for plant and equipment
- ability to work safely at heights
- ability to set up fall arrest systems, including safety nets
- ability to work safely in confined spaces
- accurate interpretation of basic structural charts and structural plans
- applying methods for making temporary connection using fibre ropes
- correct application of all scaffolding equipment
- methods for making temporary connection of guy ropes and static lines using Flexible Steel Wire Rope (FSWR)
- verify problems and equipment faults and demonstrate appropriate response.

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REQUIRED SKILLS AND KNOWLEDGE

Required knowledge

Required knowledge for this unit is:

- use of appropriate mathematical procedures for estimation and measurement of loads Commonwealth, state or territory OHS legislation and local government regulations, including standards and codes of practice relevant to the full range of techniques for undertaking basic scaffolding activities
- knowledge of principles relating to plant and equipment stability
- knowledge of types of scaffolding and their application
- knowledge of scaffolding erection and dismantling techniques
- knowledge of types of hoists, plant and equipment associated with basic scaffolding and their use/s
- risk assessment and control, including understanding of the hierarchy of control
- estimation of bearing pressures of the full range of soil types and associated ground conditions for setting up plant and equipment
- load capabilities of different types of scaffolding constructions
- understanding and application of organisational and workplace standards, requirements, policies and procedures for scaffolding
- safety equipment applicable to scaffolding
- understanding and application of the inspection and maintenance requirements for basic scaffold, associated equipment and scaffold equipment
- uses and limitations of tools and equipment, appropriate to scaffolding tasks and activities.

Evidence Guide

EVIDENCE GUIDE

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Overview of assessment

Successful assessment of this unit meets the competency requirement of the National Standard for licensing Persons Performing High Risk Work.

State/Territory OHS regulators have mandated the use of Assessment Instruments and Instructions for Assessment endorsed by the national body responsible for OHS matters for the assessment of

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EVIDENCE GUIDE

	this unit.

Critical aspects for assessment and evidence required to demonstrate competency in this unit	A person who demonstrates competency in this unit must be able to provide evidence of the ability to:
	• comply with OHS licensing requirements.
	• effectively communicate and work safely with others in the work area.
	• effectively apply risk assessment and hazard management procedures at a basic scaffolder level.
	• effectively complete the planning, erection and dismantling of a scaffolding system, in accordance with procedures, including a minimum of erect and dismantle:
	  • Modular Scaffold with return and ladder access and platform brackets (hop-up brackets)
	  • Bracket Scaffold
	  • Mobile Scaffold
	  • gin wheel
	  • Cantilever Hoist
	  • safety net and static line
	  • safety screen
	Scaffold to be of a minimum height of at least 5.0 metres above the supporting surface with full edge protection (includes safety screen) for each work platform including toe boards and handrails.
	• correctly demonstrate fibre rope bends and hitches.
	• effectively conduct pre and post operational checks of basic scaffolding.
	• complete handover certificate as required.

Context of and specific resources for assessment	• Assessment of the safe and effective application of knowledge and skill to workplace tasks (performance) must be undertaken using the National OHS endorsed Assessment Instrument • Assessment of performance must be undertaken either in the workplace or in a realistically simulated workplace setting • .Assessors must ensure that the assessment in

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	the workplace is organised to ensure that all the required equipment and materials and a suitable working area is made available to suit the assessment and the workplace
	• Assessment must occur under standard and authorised work practices, safety requirements and environmental constraints for basic scaffolding
	• Applicants must have access to:
	  • personal protective equipment (PPE) for the purpose of the Performance Assessment
	  • appropriate safety equipment in safe condition
	  • appropriate scaffolding and associated scaffolding equipment
	  • communication equipment (e.g. fixed channel two way radios) where applicable
	  • appropriate personnel to assist with the erecting and dismantling of scaffold and scaffold equipment.

Method of assessment	Assessment must be conducted using the national OHS endorsed Assessment Instruments. These Instruments provide advice on their application. Assessment may be in conjunction with the assessment of other units of competency. The use of **'simulators'** in the assessment of this unit of competency is **not acceptable**. Assessment methods must confirm consistency and accuracy of performance together with application of underpinning knowledge. Assessment must confirm a reasonable inference that competency is not only able to be satisfied under the particular circumstance, but is able to be transferred to other circumstances.
Guidance information for assessment	Further information about endorsed Assessment Instruments may be obtained from state/territory OHS regulators.

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Range Statement

RANGE STATEMENT

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Hazards may include but not limited to:	• ground conditions (e.g. ground bearing pressure/s, back filled trenches, underground services, slopes) • overhead hazards (e.g. power lines, service pipes) (minimum clearance distance from powerlines or electrical equipment as determined by relevant state authority or electrical supply authority) • traffic (e.g. pedestrians, vehicles, other plant) • insufficient lighting • environmental conditions (e.g. wind, lightning, storms) • other site specific hazards (e.g. hazardous materials).
Hazard control measures:	Refers to the systematic process of eliminating or reducing the risk to personnel and property through the application of controls. It includes the application of the hierarchy of control, the six-step preference of control measures to manage and control risk: • elimination • substitution • isolation • engineering control measures • using safe work practices • personal protective equipment.
Appropriate standards may include:	• codes of practice • legislation • Australian Standards • manufacturer's specifications • industry standards (where applicable).
Site Information may include, but not be limited to:	• local conditions such as access and egress • work method statements

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RANGE STATEMENT

	• site-specific job safety analyses and other documentation as required • task plans.

Scaffold may include but not limited to:	• mobile scaffolding
	• bracket scaffolding
	• modular scaffolding, including:
	  • steel
	  • fibreglass and
	  • aluminium frame scaffolding
	• prefabricated scaffolding.

Associated equipment may include but not limited to:	• planks
	• flexible steel wire rope and fittings.
	NB: including identification, uses and connections which may include termination for static lines and guys for cantilever hoists.
	• ladders
	• tie tubes and fittings
	• fibre rope
	NB: including identification and uses (natural and synthetic), and connections associated with bends and hitches.
	• stairways and screening
	• hand tools, including, but not limited to:
	  • box spanners
	  • hammers
	  • spirit levels
	  • tape measures
	  • scaffold belts
	  • podgers
	  • hammers
	  • wire nips
	  • wrenches
	  • torpedo levels
	  • shovels
	  • spanners
	  • cutters
	  • hammer drills
	  • sledge hammers

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RANGE STATEMENT

	• wheel barrows and • relevant maintenance equipment.
Scaffolding equipment may include but not limited to:	• materials hoists • gin wheels • safety nets • static lines and fittings.
Appropriate personnel may include, but are not limited to:	• supervisors • colleagues • managers who are authorised to take responsibility for the workplace or operations • other scaffolders • other site personnel as applicable.
Safety equipment may include but not limited to:	• safety harness • energy absorber • lanyard • inertia reel.
Forces and Loads may include, but are not limited to:	• dead loads • live loads • static load • dynamic loads • wind loads.
Communication Methods may include but not limited to:	• verbal and non-verbal language • written instructions • signage • communication signals • listening • questioning to confirm understanding, and appropriate worksite protocol.
Procedures may include but not limited to:	• manufacturer's guidelines (instructions, specifications or checklists) • industry operating procedures, relevant codes of practice • workplace procedures (work instructions, operating procedures, checklists) • reporting and recording procedures such as e.g. equipment defect/s.
Communication equipment may include but is not limited to:	• fixed frequency two way radios • mobile phones.
Hazard prevention/control measures may include but not	• safety tags on electrical switches/isolators • safety observer used inside exclusion zone

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RANGE STATEMENT

limited to:	(e.g. Spotter), to include the use of power line warning systems (e.g. Tiger tails) • power disconnected by competent authority where applicable • traffic and pedestrian barricades and controls • safe and adequate access / egress is established • personal protective equipment • adequate illumination.
Ground suitability may include but not limited to:	• rough uneven ground • backfilled ground • soft soils • hard compacted soil • rock • bitumen • concrete.
Stability may include but is not limited to:	• ground bearing pressure • sole plates/boards • screw jacks • levelling • ties/guys.

Unit Sector(s)

Unit sector Construction

Co-requisite units

Co-requisite units Nil

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Functional area

Functional area

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CPCCLSF3001A Licence to erect, alter and dismantle scaffolding intermediate level

Modification History

Not Applicable

Unit Descriptor

Unit descriptor

This unit specifies the outcomes required to erect, alter and dismantle scaffolding at the Intermediate level which includes use and operation of Cantilevered crane-loading platforms, Cantilevered and spurred scaffolds, Barrow ramps and sloping platforms, perimeter safety screens and shutters Mast climbers, and tube and coupler scaffolds (including tube and coupler covered ways and gantries) for licensing purposes.

Application of the Unit

Application of the unit

This unit covers the scope of work to plan the job, select and inspect equipment, set up task, erect scaffold and scaffold equipment and dismantle scaffold and scaffolding equipment.

This unit is based upon the National Standard for Licensing Persons Performing High Risk Work.

This unit in its current form meets state and territory licensing requirements. Any alteration will result in a unit which is not acceptable to regulators for the purpose of licensing.

This unit has a pre-requisite requirement. This requirement may be met by either the successful completion of the unit *CPCCLSF2001A Licence to erect, alter and dismantle scaffolding basic level* or holding a valid licence for basic scaffolding.

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Licensing/Regulatory Information

Refer to Unit Descriptor

Pre-Requisites

Prerequisite units

CPCCLSF2001A	Licence to erect, alter and dismantle scaffolding basic level

Employability Skills Information

Employability skills This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Plan job.	1.1. Task to be undertaken is assessed. 1.2. Potential workplace ***hazards*** are identified. 1.3. ***Hazard control measures*** are identified consistent with ***appropriate standards*** to ensure the safety of personnel and equipment. 1.4. Site information is obtained.

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ELEMENT	PERFORMANCE CRITERIA
	1.5. ***Scaffold***, ***associated equipment*** and ***scaffold equipment*** are identified from site information and in consultation with appropriate ***personnel*** (where applicable). 1.6. ***Safety equipment*** is identified. 1.7. All ***forces and loads*** exerted on and by the scaffold and/or scaffolding equipment are determined and calculated. 1.8. Appropriate ***communication methods*** are identified with appropriate personnel.
2. Select and inspect equipment.	2.1. Scaffold, associated equipment and scaffold equipment are selected and inspected according to ***procedures*** and site information. 2.2. Safety equipment is selected and inspected according to procedures. 2.3. All defective scaffold, associated equipment, scaffold equipment and safety equipment are isolated according to procedures. 2.4. All defective scaffold, associated equipment, scaffold equipment and safety equipment are reported and recorded according to procedures. 2.5. ***Communication equipment*** is selected and inspected for serviceability (where applicable).
3. Set up task.	3.1. Appropriate ***hazard prevention***/***control measures*** are applied to the work area according to procedures. 3.2. Ground suitability is checked. 3.3. Appropriate footings are prepared to support scaffold and scaffold equipment according to procedures and the appropriate standard. 3.4. Scaffold and scaffold equipment are prepared for erection 3.5. Fit safety equipment and secure according to procedures (where applicable). 3.6. Scaffold and scaffold equipment are positioned for work application and ***stability*** according to procedures and the appropriate standard.
4. Erect scaffold and scaffolding equipment.	4.1. Scaffold and scaffold equipment are erected according to procedures and the appropriate standard. 4.2. Work is conducted safely at heights including safe and effective use of safety equipment. 4.3. Scaffold and scaffold equipment are erected

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ELEMENT	PERFORMANCE CRITERIA
	consistent with site information. 4.4. Appropriate communication methods are used to coordinate the tasks. 4.5. Completed tasks are inspected for compliance with the appropriate standard. 4.6. Handover certificate is completed as required and handed to appropriate personnel. 4.7. Excess materials from the work area are removed (where applicable).
5. Dismantle scaffold and scaffolding equipment.	5.1. Scaffold and scaffold equipment are dismantled according to procedures and the appropriate standard. 5.2. Work is conducted safely at heights including safe and effective use of safety equipment. 5.3. Scaffold, associated equipment and scaffold equipment are inspected for damage and defects. 5.4. All damaged and defective scaffold, associated equipment and scaffold equipment are tagged and isolated according to procedures. 5.5. Hazard prevention/control measures are removed (where appropriate). 5.6. All damaged and defective scaffold, associated equipment and scaffold equipment are reported and recorded according to procedures and appropriate action taken.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Required skills for this unit are:

- ability to erect scaffold and scaffolding equipment within the scope of the intermediate scaffolder
- ability to erect, level, plumb and stabilise scaffolds and scaffold equipment within the scope of the intermediate scaffolder
- ability to interpret manufacturer's specifications for plant and equipment

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REQUIRED SKILLS AND KNOWLEDGE

- ability to work safely at heights
- accurate interpretation of basic structural charts and structural plans
- correct application of all scaffolding equipment
- verify problems and equipment faults and demonstrate appropriate response.

Required knowledge

Required knowledge for this unit is:

- use of appropriate mathematical procedures for estimation and measurement of loads
- Commonwealth, state or territory OHS legislation and local government regulations, including standards and codes of practice relevant to the full range of techniques for undertaking intermediate scaffolding activities
- knowledge of principles relating to plant and equipment stability
- knowledge of types of scaffolding and their application
- knowledge of scaffold and scaffold equipment erection and dismantling techniques
- knowledge of types of scaffold and scaffold equipment, associated with intermediate scaffolding and their use/s
- risk assessment and control, including understanding of the hierarchy of control
- load capabilities of different types of scaffolding constructions
- understanding and application of organisational and workplace standards, requirements, policies and procedures for scaffolding
- application of safety equipment applicable to scaffolding
- understanding and application of the inspection and maintenance requirements for intermediate scaffold, associated equipment and scaffold equipment
- uses and limitations of tools and equipment, appropriate to scaffolding tasks and activities.

Evidence Guide

EVIDENCE GUIDE

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Overview of assessment	Successful assessment of this unit meets the competency requirement of the National Standard for licensing Persons Performing High Risk Work. State/Territory OHS regulators have mandated the use of Assessment Instruments and Instructions for

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	Assessment endorsed by the national body responsible for OHS matters for the assessment of this unit.

Critical aspects for assessment and evidence required to demonstrate competency in this unit	A person who demonstrates competency in this unit must be able to provide evidence of the ability to:
	• Effectively communicate and work safely with others in the work area.
	• Effectively apply risk assessment and hazard management procedures at an intermediate scaffolder level.
	• Effectively complete the planning, erection and dismantling of scaffolding systems, in accordance with procedures, including a minimum of erect and dismantle the following:
	  • Cantilevered and spurred scaffolds
	  • Barrow ramps and/ or sloping platforms
	  • Tube and coupler scaffolds
	  • Cantilevered crane-loading platforms
	  • Mast climbers
	Cantilevered, spurred and tube and coupler scaffolds to be of a minimum height of 5.0 metres above the supporting surface with full edge protection, for each work platform including toe boards and handrails.
	• Apply safety screen to tube and coupler scaffold.
	• Effectively conduct compliance inspections of scaffold and scaffold equipment for intermediate scaffolding.
	• Complete handover certificate as required.

Context of and specific resources for assessment	• Assessment of the safe and effective application of knowledge and skill to workplace tasks (performance) must be undertaken using the National OHS endorsed Assessment Instrument. • Assessment of performance must be undertaken either in the workplace or in a realistically simulated workplace setting. • Assessors must ensure that the assessment in the workplace is organised to ensure that all the required equipment and materials and a

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EVIDENCE GUIDE

	suitable working area is made available to suit the assessment and the workplace.
	• Assessment must occur under standard and authorised work practices, safety requirements and environmental constraints for intermediate scaffolding.
	• Applicants must have access to:
	  • personal protective equipment (PPE) for the purpose of the Performance Assessment
	  • appropriate safety equipment in safe condition
	  • appropriate scaffold and scaffold equipment in safe condition
	  • site information as described in the mandated assessment instrument
	  • communication equipment (e.g. fixed channel two way radios) where applicable
	  • appropriate personnel to assist with the erecting and dismantling of scaffold and scaffold equipment.

Method of assessment	Assessment must be conducted using the national OHS endorsed Assessment Instruments. These Instruments provide advice on their application. Assessment may be in conjunction with the assessment of other units of competency. The use of **'simulators'** in the assessment of this unit of competency is **not acceptable**. Assessment methods must confirm consistency and accuracy of performance together with application of underpinning knowledge. Assessment must confirm a reasonable inference that competency is not only able to be satisfied under the particular circumstance, but is able to be transferred to other circumstances.
Guidance information for assessment	Further information about endorsed assessment instruments may be obtained from state/territory OHS regulators.

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Range Statement

RANGE STATEMENT

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Hazards may include but not limited to:	• ground conditions (e.g. ground bearing pressure/s, back filled trenches, underground services, slopes) • overhead hazards (e.g. power lines, service pipes) (minimum clearance distance from powerlines or electrical equipment as determined by relevant state authority or electrical supply authority.) • traffic (e.g. pedestrians, vehicles, other plant) • insufficient lighting • environmental conditions (e.g. wind, lightning, storms) • other site specific hazards (e.g. hazardous materials).
Hazard control measures:	Refers to the systematic process of eliminating or reducing the risk to personnel and property through the application of controls. It includes the application of the hierarchy of control, the six-step preference of control measures to manage and control risk: • elimination • substitution • isolation • engineering control measures • using safe work practices • personal protective equipment.
Appropriate standards may include:	• codes of practice • legislation • Australian Standards • manufacturer's specifications • industry standards (where applicable).
Site Information may include, but not limited to:	• local conditions such as access and egress • work method statements

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RANGE STATEMENT

	• site-specific job safety analyses and other documentation as required • task plans.
Scaffold may include but not limited to:	• all scaffolds at the basis level • cantilevered and spurred scaffolds • barrow ramps and sloping platforms • tube and coupler scaffolds (including tube and coupler covered ways and gantries) • cantilever loading platforms.
Associated equipment may include but not limited to:	• all associated equipment from basic scaffolding level • independent adjustable props.
Scaffold equipment may include but not limited to:	• all scaffold equipment at the basic level • mast climbers • screen and shutters.
Appropriate personnel may include, but are not limited to:	• supervisors • colleagues • managers who are authorised to take responsibility for the workplace or operations • other scaffolders • other site personnel as applicable.
Safety equipment may include but not limited to:	• safety harness • energy absorber • lanyard • inertia reel.
Forces and Loads may include, but are not limited to:	• dead loads • live loads • static load • dynamic loads • wind loads.
Communication Methods may include but not limited to:	• verbal and non-verbal language • written instructions • signage • communication signals • listening • questioning to confirm understanding, and appropriate worksite protocol.
Procedures may include but not limited to:	• manufacturer's guidelines (instructions, specifications or checklists) • industry operating procedures, relevant codes

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RANGE STATEMENT

	of practice • workplace procedures (work instructions, operating procedures, checklists) • reporting and recording procedures such as e.g. scaffold and scaffold equipment defects.
Communication equipment may include but not limited to:	• fixed frequency two way radios • mobile phones.
Hazard prevention/control measures may include but not limited to:	• safety tags on electrical switches/isolators • safety observer used inside exclusion zone (e.g. Spotter), to include the use of power line warning systems (e.g. Tiger tails) • power disconnected by competent authority where applicable. • traffic and pedestrian barricades and controls • safe and adequate access / egress is established • personal protective equipment • adequate illumination.
Ground suitability may include but not limited to:	• rough uneven ground • backfilled ground • soft soils • hard compacted soil • rock • bitumen • concrete.
Stability may include but not limited to:	• ground bearing pressure • sole plates/boards • screw jacks • levelling • ties/guys.

Unit Sector(s)

Unit sector Construction

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Co-requisite units

Co-requisite units Nil

Functional area

Functional area

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CPCCLSF4001A Licence to erect, alter and dismantle scaffolding advanced level

Modification History

Not Applicable

Unit Descriptor

Unit descriptor This unit specifies the outcomes required to erect, alter and dismantle scaffolding at the Advanced level. Scaffolding consists of all intermediate scaffolding work including all other scaffolding work connected with the use and operation of Hung scaffolds and Suspended scaffolds for licensing purposes.

Application of the Unit

Application of the unit

This unit covers the scope of work to plan the job, select and inspect equipment, set up task, erect scaffold and scaffold equipment and dismantle scaffold and scaffolding equipment.

This unit is based upon the National Standard for Licensing Persons Performing High Risk Work.

This unit in its current form meets state and territory licensing requirements. Any alteration will result in a unit which is not acceptable to regulators for the purpose of licensing.

This unit has a pre-requisite requirement. This requirement may be met by either the successful completion of the unit *CPCCLSF3001A Licence to erect, alter and dismantle scaffolding intermediate level* or holding a valid licence for intermediate scaffolding.

Licensing/Regulatory Information

Refer to Unit Descriptor

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Pre-Requisites

Prerequisite units

CPCCLSF3001A	Licence to erect, alter and dismantle scaffolding intermediate level

Employability Skills Information

Employability skills This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Plan job.	1.1. Task to be undertaken is assessed. 1.2. Potential workplace ***hazards*** are identified. 1.3. ***Hazard control measures*** are identified consistent with ***appropriate standards*** to ensure the safety of personnel and equipment. 1.4. Site information is obtained. 1.5. Scaffold, associated equipment and scaffold equipment are identified from site information in consultation with appropriate personnel. 1.6. ***Safety equipment*** is identified. 1.7. All ***forces and loads*** exerted on and by the scaffold

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ELEMENT	PERFORMANCE CRITERIA
	and/or scaffolding equipment are determined and calculated.
	1.8. Appropriate ***communication methods*** are identified with appropriate personnel.
2. Select and inspect equipment.	2.1. Scaffold, associated equipment and scaffold equipment are selected and inspected according to procedures and site information.
	2.2. Safety equipment is selected and inspected according to ***procedures***.
	2.3. All defective scaffold, associated equipment and scaffold equipment are isolated according to procedures.
	2.4. All defective scaffold, associated equipment, scaffold equipment and safety equipment are reported and recorded according to procedures.
	2.5. ***Communication equipment*** is selected and inspected for serviceability (where applicable).
3. Set up task.	3.1. Appropriate ***hazard prevention***/***control measures*** are applied to the work area according to procedures.
	3.2. Scaffold and scaffold equipment are prepared for erection according to procedures.
	3.3. Fit safety equipment and secure according to procedures (where applicable).
4. Erect scaffold and scaffolding equipment.	4.1. Scaffold and scaffold equipment are erected according to procedures and the appropriate standard.
	4.2. Work is conducted safely at heights including safe and effective use of safety equipment.
	4.3. Scaffold and scaffold equipment are erected consistent with site information.
	4.4. Appropriate communication methods are used to coordinate the tasks.
	4.5. Completed tasks are inspected for compliance with the appropriate standard.
	4.6. Handover certificate is completed as required and handed to appropriate personnel.
	4.7. Excess materials from the work area are removed (where applicable).
5. Dismantle scaffold and scaffolding equipment.	5.1. Scaffold and scaffold equipment is dismantled according to procedures and the appropriate standard.

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ELEMENT	PERFORMANCE CRITERIA
	5.2. Work is conducted safely at heights including safe and effective use of safety equipment. 5.3. Scaffold, associated equipment and scaffold equipment are inspected for damage and defects. 5.4. All damaged and defective scaffold, associated equipment and scaffold equipment is tagged and isolated in accordance with procedures. 5.5. Hazard prevention/control measures are removed (where appropriate). 5.6. All damaged and defective scaffold, associated equipment and scaffold equipment are reported and recorded according to procedures and appropriate action taken.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Required skills for this unit are:

- ability to erect scaffold and scaffold equipment within the scope of the advanced scaffolder
- ability to erect, level, plumb and stabilise scaffolds and scaffold equipment within the scope of the advanced scaffolder
- ability to work safely at heights
- ability to interpret manufacturer's specifications for plant and equipment
- accurate interpretation of structural charts and structural plans
- correct application of all scaffolding equipment
- verify problems and equipment faults and demonstrate appropriate response.

Required knowledge

Required knowledge for this unit is:

- use of appropriate mathematical procedures for estimation and measurement of loads
- Commonwealth, state or territory OHS legislation and local government regulations, including standards and codes of practice relevant to the full range of techniques for undertaking advanced scaffolding activities

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REQUIRED SKILLS AND KNOWLEDGE

- knowledge of principles relating to plant and equipment stability
- knowledge of types of scaffolding and their application
- knowledge of scaffold and scaffold equipment erection and dismantling techniques
- knowledge of types scaffold and scaffold equipment, associated with advanced scaffolding and their use/s
- risk assessment and control, including understanding of the hierarchy of control
- load capabilities of different types of scaffolding constructions
- understanding and application of organisational and workplace standards, requirements, policies and procedures for scaffolding
- application of safety equipment applicable to scaffolding
- understanding and application of the inspection and maintenance requirements for advanced scaffold, associated equipment and scaffold equipment
- uses and limitations of tools and equipment, appropriate to scaffolding tasks and activities.

Evidence Guide

EVIDENCE GUIDE

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Overview of assessment	Successful assessment of this unit meets the competency requirement of the National Standard for licensing Persons Performing High Risk Work. State/Territory OHS regulators have mandated the use of Assessment Instruments and Instructions for Assessment endorsed by the national body responsible for OHS matters for the assessment of this unit.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	A person who demonstrates competency in this unit must be able to provide evidence of the ability to: • Effectively communicate and work safely with others in the work area. • Effectively apply risk assessment and hazard management procedures at an advanced scaffolder level.

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EVIDENCE GUIDE

	• Effectively complete the planning, erection and dismantling of scaffolding systems, in accordance with procedures, including a minimum of erection and dismantling of:
	  • a hung scaffold, and
	  • a suspended scaffold.
	
	Hung scaffold means a scaffold that is hung from another structure and that is not capable of being raised or lowered when in use.
	
	Suspended scaffold means a scaffold incorporating a suspended platform that is capable of being raised or lowered when in use.
	
	• Effectively conduct compliance inspections of scaffold and scaffold equipment for advanced scaffolding.
	• Complete handover certificate as required

Context of and specific resources for assessment	• Assessment of the safe and effective application of knowledge and skill to workplace tasks (performance) must be undertaken using the National OHS endorsed Assessment Instrument
	• Assessment of performance must be undertaken either in the workplace or in a realistically simulated workplace setting
	• .Assessors must ensure that the assessment in the workplace is organised to ensure that all the required equipment and materials and a suitable working area is made available to suit the assessment and the workplace
	• Assessment must occur under standard and authorised work practices, safety requirements and environmental constraints for basic scaffolding
	• Applicants must have access to:
	  • personal protective equipment (PPE) for the purpose of the Performance Assessment
	  • appropriate safety equipment in safe condition
	  • appropriate scaffolding and scaffold equipment in safe condition
	  • site information as described in the mandated assessment instrument

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EVIDENCE GUIDE

	• communication equipment (e.g. fixed channel, two-way radios) where applicable • appropriate personnel to assist with the erecting and dismantling of scaffold and scaffold equipment.
Method of assessment	Assessment must be conducted using the national OHS endorsed Assessment Instruments. These Instruments provide advice on their application. Assessment may be in conjunction with the assessment of other units of competency. The use of **'simulators'** in the assessment of this unit of competency is **not acceptable**. Assessment methods must confirm consistency and accuracy of performance together with application of underpinning knowledge. Assessment must confirm a reasonable inference that competency is not only able to be satisfied under the particular circumstance, but is able to be transferred to other circumstances.
Guidance information for assessment	Further information about endorsed Assessment Instruments may be obtained from state/territory OHS regulators.

Range Statement

RANGE STATEMENT

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Hazards may include but not limited to:	• overhead hazards (e.g. power lines, service pipes) (minimum clearance distance from powerlines or electrical equipment as determined by relevant state authority or electrical supply authority)

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RANGE STATEMENT

	• traffic (e.g. pedestrians, vehicles, other plant) • insufficient lighting • environmental conditions (e.g. wind, lightning, storms) • other site specific hazards (e.g. hazardous materials).
Hazard control measures:	Refers to the systematic process of eliminating or reducing the risk to personnel and property through the application of controls. It includes the application of the hierarchy of control, the six-step preference of control measures to manage and control risk: • elimination • substitution • isolation • engineering control measures • using safe work practices • personal protective equipment.
Appropriate standards may include:	• codes of practice • legislation • Australian Standards • manufacturer's specifications • industry standards (where applicable).
Site Information may include, but not limited to:	• local conditions such as access and egress • work method statements • site-specific job safety analyses and other documentation as required.
Scaffold may include but not limited to:	• all scaffold at the basis and intermediate levels • hung scaffolds, including scaffolds hanging from tubes, wire ropes or chains • suspended scaffolds.
Associated equipment may include but not limited to:	• all associated equipment at the basic and intermediate levels • counterweights • prefabricated needles.
Scaffolding equipment may include but not limited to:	• all scaffold equipment at the basis and intermediate level • swinging stages.
Appropriate personnel may	• supervisors

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RANGE STATEMENT

include, but is not limited to:	• colleagues • managers who are authorised to take responsibility for the workplace or operations • other scaffolders • other site personnel as applicable.
Safety equipment may include but is not limited to:	• safety harness • energy absorber • lanyard • inertia reel.
Forces and Loads may include, but are not limited to:	• dead loads • live loads • static load • dynamic loads • wind loads.
Communication Methods may include but are not limited to:	• verbal and non-verbal language • written instructions • signage • communication signals • listening • questioning to confirm understanding, and appropriate worksite protocol.
Procedures may include but are not limited to:	• manufacturer's guidelines (instructions, specifications or checklists) • industry operating procedures, relevant codes of practice • workplace procedures (work instructions, operating procedures, checklists) • reporting and recording procedures such as e.g. equipment defect/s.
Communication equipment may include but is not limited to:	• fixed frequency radios • mobile phones.
Hazard prevention/control measures may include but are not limited to:	• safety tags on electrical switches/isolators • safety observer used inside exclusion zone (e.g. Spotter), to include the use of power line warning systems (e.g. Tiger tails) • power disconnected by competent authority where applicable. • traffic and pedestrian barricades and controls • safe and adequate access / egress is established

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RANGE STATEMENT

- personal protective equipment
- adequate illumination.

Unit Sector(s)

Unit sector Construction

Co-requisite units

Co-requisite units Nil

Functional area

Functional area

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LGAWORK404A Manage a civil works project

Modification History

LGAWORK404A Release 2: Layout adjusted.

LGAWORK404A Release 1: Primary release.

Unit Descriptor

This unit covers managing a civil works project within council areas. The unit addresses all aspects of planning, implementing and monitoring a civil works project through to completion, including the documentation required to support the project.

Application of the Unit

This unit supports the attainment of skills and knowledge required for competent workplace performance in councils of all sizes and in varying locations. Knowledge of the legislation and regulations that provide the boundaries for the operation of civil works in councils is essential. The unit is particularly appropriate for staff responsible for supervising civil works projects and ensuring project outcomes are met.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a Unit of Competency	Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the Range Statement. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 **Evaluate and assess the project**	1.1 A site evaluation is organised and undertaken to determine scope of project. 1.2 Work scope, desired outcomes and key dates are identified and recorded according to ***relevant legislation and standards .*** 1.3 Required ***resources*** are identified and their availability is determined.
2 **Plan and document the project**	2.1 Tasks associated with the project are identified and documented. 2.2 The preparation of technical specifications is coordinated and managed to completion within the required time frame. 2.3 An overview plan is prepared, distributed and reviewed by key stakeholders. 2.4 ***Contingency plans*** are developed to ensure that delays in completing the project are addressed as early as possible. 2.5 Effective and efficient communication strategies are developed and ***documented*** to meet the needs of project stakeholders and service providers.
3 **Prepare for project implementation**	3.1 A workforce with required numbers and skills is established and fully briefed as to job requirements and planned time frame. 3.2 Priorities are organised to ensure agreed time frame is met. 3.3 Resources are ordered and arrangements are initiated to ensure delivery to site in accordance with planned time frame. 3.4 Project plan and schedule are drawn up, reviewed and amended where necessary.
4 **Implement the project plan**	4.1 A workforce with required numbers and skills is established and fully briefed as to job requirements and planned time frame. 4.2 Priorities are organised to ensure agreed time frame is met. 4.3 Resources are ordered and arrangements are initiated to ensure delivery to site in accordance with planned time frame. 4.4 ***Project plan*** and schedule are drawn up, reviewed and amended where necessary.
5 **Monitor the project**	5.1 Project is regularly reviewed against project plan in relation

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ELEMENT	PERFORMANCE CRITERIA
	to safety, quality, resources, time frames, costs and equipment.
	5.2 Deviations from the project plan are identified and actions are taken to recover original project program.
	5.3 Deviations from original program requirements are reported to the appropriate personnel and direction is sought where necessary.
6 **Complete documentation**	6.1 Quality assurance documents and reports are provided in accordance with statutory, organisation or site requirements.
	6.2 Plant and maintenance records are maintained in accordance with occupational health and safety (OHS) requirements.
	6.3 Project completion is reviewed against the established plan and opportunities for future improvement are established and documented.

Required Skills and Knowledge

This describes the essential skills and knowledge and their level, required for this unit

Required Skills

- contingency management
- applying quality assurance and quality control procedures
- identifying sources of errors
- coordinating work scope
- priority management and organisational skills
- leadership and management skills
- communication
- time management
- resource management
- project management
- using construction equipment and materials
- conducting mathematical calculations relevant to civil construction works

Required Knowledge

- relevant OHS regulations
- relevant statutory legislation and codes of practice
- relevant site safety procedures
- environmental awareness and procedures

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- location of relevant plant and equipment
- quality assurance and control procedures
- plant and related systems
- contractual procedures
- project management principles and concepts
- work scope coordination and preparation
- human resource management principles
- civil construction knowledge and experience
- survey methodologies
- mathematical calculations relevant to planning and implementing civil works constructions

Evidence Guide

Overview of assessment requirements	A person who demonstrates competency in this unit will be able to perform the outcomes described in the Elements to the required performance level detailed in the Performance Criteria. The knowledge and skill requirements described in the Range Statement must also be demonstrated. For example, knowledge of the legislative framework and safe work practices that underpin the performance of the unit must be demonstrated.
Critical aspects of evidence to be considered	The demonstrated ability to: • develop, implement and review detailed and thorough project plans in relation to civil works completed for council • forecast, plan for and manage contingencies to ensure project outcomes are met within agreed time frames • document accurately all project details according to legislative requirements and council standards • ensure compliance with all legislative and regulatory requirements including observance of OHS legislation
Context of assessment	Competency is demonstrated by performance of all stated criteria, with particular attention to the critical aspects of evidence and the knowledge and skills elaborated in the Evidence Guide, and within the scope of the Range Statement. Assessment must take account of the endorsed Assessment Guidelines in the Local Government Training Package. Assessment of the performance requirements in this unit should be undertaken in an actual workplace or simulated environment.

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	Assessment should reinforce the integration of the key competencies for the particular AQF level. Refer to the key competency levels at the end of this unit.
Relationship to other units (**prerequisite or co-requisite units**)	To enable holistic assessment this unit may be assessed with other units that form part of the job role.
Method of assessment	The following assessment methods are suggested: • observation of the learner performing a range of workplace tasks over sufficient time to demonstrate handling of a range of contingencies • written and/or oral questioning to assess knowledge and understanding • completion of workplace documentation • third-party reports from experienced practitioners • completion of self-paced learning materials including personal reflection and feedback from trainer, coach or supervisor
Evidence required for demonstration of consistent performance	Evidence should be collected over a set period of time that is sufficient to include an appropriate range and variety of situations.
Resource implications	The learner and trainer should have access to appropriate documentation and resources normally used in the workplace.

Range Statement

The Range Statement relates to the Unit of Competency as a whole. It allows for different work environments and situations that may affect performance. ***Bold italicised*** wording in the Performance Criteria is detailed below.

Relevant legislation and standards may include:	• OHS • quality assurance, including relevant Australian standards • environmental legislation • council regulations and by-laws
Resources may include:	• materials • plant • equipment, including specialist equipment • tools • finances • specialist contractors and personnel
Contingency plans may	• weather changes

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need to consider:	• worker injuries or illnesses • worker absences • supply breakdowns • machinery failures
Documentation may include:	• job cards • budgets • cost centres • check sheets • safety rule procedures • plant records • drawings • quality assurance procedures and documentation • maintenance procedures • codes of practice • contract specifications
Communication strategies may include:	• regular meetings with clients • regular meetings with field staff
Service providers may include:	• internal staff • contractors • contract specialists
Project plans may be drawn using:	• Gantt charts • PERT charts

Unit Sector(s)

Operational Works

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MEM05004C Perform routine oxy acetylene welding

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers preparing materials and performing routine oxy acetylene welding.

Application of the Unit

Application of the unit	This unit applies in a maintenance or manufacturing environment where the welding is not required to meet an Australian standard or equivalent. Fillet and butt welds would typically be performed on low carbon/mild steels. Where welding is required to meet Australian Standard 1554 General Purpose or equivalent codes, OHS regulations and/or licensing requirements, Unit MEM05022C (Perform advanced welding using oxy acetylene process) should be selected. **Band**: **A** **Unit Weight**: **2**

Licensing/Regulatory Information

Refer to Application of the Unit

Pre-Requisites

Prerequisite units		

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Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Identify weld requirements	1.1. Weld requirements are identified from job instructions. 1.2. Location of welds is identified in accordance with standard operating procedures and job specifications.
2. Prepare materials for welding	2.1. Materials are cleaned and prepared ready for welding.
3. Prepare equipment for welding	3.1. Welding equipment is set up correctly. 3.2. Settings and consumables are selected.
4. Perform routine welding using *oxy acetylene*	4.1. Safe welding practices are applied. 4.2. Materials are welded to job requirements. 4.3. Welds are cleaned in accordance with standard operating procedures.

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Look for evidence that confirms skills in:

- preparing materials
- setting up welding equipment
- welding with oxy acetylene fuel gas
- reading and interpreting routine information on written job instructions, specifications and standard operating procedures
- following oral instructions
- using measurement skills for joint preparation and routine oxy acetylene welding

Required knowledge

Look for evidence that confirms knowledge of:

- preparatory requirements
- materials and consumables properties and characteristics
- equipment and equipment settings
- fuel gas properties and applications
- post welding treatments
- weld characteristics
- any applicable industry standards, NOHSC guides, State/Territory regulatory codes of practice/standards
- safe work practices and procedures
- safe welding practices
- use and application of personal protective equipment for routine oxy acetylene welding

Evidence Guide

EVIDENCE GUIDE

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment

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EVIDENCE GUIDE	
Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to prepare materials and carry out routine oxy acetylene welding.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with performing routine oxy acetylene welding or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

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Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Materials	Mild and low carbon steel and cast iron
Prepared	Preheating, setting up jigs, fixtures, clamps, joint preparation
Equipment	Hoses, blowpipes, regulators
Consumables	Filler rods, fluxes
Oxy acetylene	The term 'oxy-acetylene' is used here to describe a range of fuel gases, including acetylene, LPG, hydrogen etc.
Cleaned	Fluxes

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

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Competency field

Competency field	Fabrication

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MEM05005B Carry out mechanical cutting

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers setting up and operating a range of mechanical cutting and holing equipment.

Application of the Unit

Application of the unit	This unit applies to sawing, shearing, cropping and/or holing and includes setting up and operating a range of equipment. Examples of machines that could be covered include guillotines, croppers, cold saws, band saws, automatic saws etc. Typical applications of this unit may include cutting for manufacture, production cutting and cutting of materials selected from stores in a maintenance environment. This unit does not cover hand or hand held power tools used for cutting e.g. circular saws, nibblers and side grinder. These skills are covered by Unit MEM18001C (Use hand tools) and Unit MEM18002B (Use power tools/hand held operations). This unit does not include the skills required for operational maintenance of the equipment used; these skills are covered by Unit MEM07001B (Perform operational maintenance of machines/equipment). For repair and welding of band saw blades where blade repair unit is not attached to the machine, refer to Unit MEM05013C (Perform manual production welding). **Band**: **A** **Unit Weight**: **2**

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Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		
Path 1	MEM12023A	Perform engineering measurements
	MEM18001C	Use hand tools

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Determine job requirements	1.1. Job requirements and specifications are determined from job sheets and/or instructions. 1.2. Appropriate method/machine is selected to meet specifications. 1.3. Machine is loaded and adjusted for operation consistent with standard operating procedures.
2. Select/set up machine tooling	2.1. Tooling is selected to match job requirements. 2.2. Tooling is correctly installed using standard

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ELEMENT	PERFORMANCE CRITERIA
	operating procedures. 2.3. Machine is set up and adjusted using standard operating procedures.
3. Operate mechanical cutting machine	3.1. Appropriate stops and guards are set and adjusted as required. 3.2. Material is secured and correctly positioned using measuring equipment as necessary. 3.3. Machine is started and stopped safely to standard operating procedures. 3.4. Machine is operated to cut/hole material to specifications using standard operating procedures.
4. Check material for conformance to specification	4.1. Material is checked against specification. Machine and/or tooling is adjusted as required and in process adjustments carried out as necessary. 4.2. Material is cut and/or holed to within workplace tolerances. 4.3. Material is used in most economical way. 4.4. Codes and standards are observed.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in: • loading and adjusting cutting machines • selecting machines and tooling • installing cutting tool • setting up and adjusting cutting machine • securing and correctly positioning materials • cutting and holing materials • applying relevant codes and standards • reading and interpreting routine information on written job instructions, specifications and standard operating procedures • following oral instruction • measuring materials to specified workplace tolerances and within the machine

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REQUIRED SKILLS AND KNOWLEDGE
range • clarifying routine task-related information
Required knowledge
Look for evidence that confirms knowledge of: • the characteristics of cutting methods and machines • effect of materials on the machine tooling, tooling defects and adjustments • effect of adjustments on the dimensions of the cut material • applicable tolerances • methods of marking out materials to ensure minimum wastage • any applicable industry standards, national/Australian standards, NOHSC guides, State/Territory regulatory codes of practice/standard • use and application of personal protective equipment for mechanical cutting • safe work practices and procedures

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to carry out mechanical cutting on a range of machines. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this

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EVIDENCE GUIDE	
	unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication materials handling, recording and reporting associated with carrying out mechanical cutting or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Machine	Guillotines, croppers, cold saws, band saws, automatic saws etc.
Tooling	Tooling to suit guillotines, croppers, cold saws, band saws, automatic saws etc.

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RANGE STATEMENT	
Stops and guards	All safety equipment/stops/guards on guillotines, croppers, cold saws, band saws, automatic saws etc.
Material	Ferrous and non-ferrous metals and non-metallic products
Codes and standards	Legislative and regulatory requirements, industry and enterprise codes and standards

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Fabrication

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MEM05007C Perform manual heating and thermal cutting

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers performing manual heating, thermal cutting and gouging including the assembly and disassembly and operation of the equipment on a range of materials (ferrous, non-ferrous and non-metallic) using a variety of methods.

Application of the Unit

Application of the unit	This unit applies to manual, straight line cutting standards. Manual or automatic processes are used to cut and heat to specifications. Cutting may include flame gouging by hand. All work is carried out to legislative and regulatory requirements. Predetermined standards of quality and safety are observed and work is carried out following standard operating procedures. **Band**: **A** **Unit Weight**: **2**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		

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Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Assemble/disassemble plant and equipment	1.1. Accessories and equipment are correctly selected and assembled for manual heating and thermal cutting.
2. Operate heating and thermal cutting equipment	2.1. Cutting process and/or procedure appropriate for material is selected. 2.2. All safety procedures are observed. 2.3. Equipment start-up procedures are followed correctly to standard operating procedures. 2.4. Equipment adjustments are made correctly using standard operating procedures. 2.5. Appropriate cutting allowances are made. 2.6. Material is used in the most economical way. 2.7. Defects are identified and corrective action is taken to standard operating procedures. 2.8. Material is heated and cut to specification.

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ELEMENT	PERFORMANCE CRITERIA
	2.9. Shape/size/length is to accepted workplace standards.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in: • performing pre-start checks • safely starting equipment • following standard operating procedures • adjusting equipment to operating specifications • making cutting allowances • economising material and minimising wastage • identifying cutting defects and taking corrective action • heating and cutting materials to specifications • reading and interpreting routine information on written job instructions, specifications and standard operating procedures. May include drawings • following oral instructions • performing measurements needed to meet the requirements of this unit • entering routine and familiar information onto proformas and standard workplace forms
Required knowledge
Look for evidence that confirms knowledge of: • cutting processes appropriate to various materials • heating and cutting specifications • procedures for heating and cutting • the tools, equipment and techniques for heating and cutting • assembling procedures for equipment and accessories • hazards and control measures associated with manual heating and thermal cutting • use and application of personal protective clothing and equipment • equipment pre-checks and operation • procedures for adjusting heating and cutting equipment

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REQUIRED SKILLS AND KNOWLEDGE
• cutting allowances and reasons for applying them • procedures for minimising waste material • reasons for minimising waste material • cutting defects and their causes • procedures for correcting cutting defects • tools, equipment and techniques required to correct cutting defects • use and application of personal protective equipment • safe work practices and procedures

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to perform manual heating and thermal cutting.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with manual heating/thermal cutting or other units requiring the exercise of the skills and knowledge covered by this unit.

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EVIDENCE GUIDE	
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questions should not require language, literacy and numeracy skills beyond those required in this unit. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Cutting	Use of hand held and self-propelled straight line cutters
Process	Fuel gas, oxy fuel gas and air fuel gas
Material	Various thicknesses and types including ferrous, non-ferrous and non-metallic materials

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Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Fabrication

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MEM05011D Assemble fabricated components

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit of competency covers the assembly of general fabricated components in plate, pipe and section or sheet either on-site or in a typical fabrication workplace by an Engineering Tradesperson - Fabrication. Assembly is performed according to specifications or drawings. The unit covers trade level assembly techniques requiring the use of jigs, fixtures and tools.

Application of the Unit

Application of the unit	This unit of competency applies to assembly of ferrous and non-ferrous fabrications to specifications including use of joining techniques. Skills covered by this unit are generally applied in occupational and work situations associated with steel fabrication, boilermaking or sheet metal work. This unit has been developed for Engineering Tradesperson - Fabrication apprenticeship training and the recognition of trade skills in assembly of fabricated components. Typical applications are transitions, pipeworks and structural fabrication, ductwork, general jobbing work, fired and unfired pressure vessels. Work may be undertaken in plant or on-site, and as part of a team in many instances in cooperation with those with rigging/dogging skills where necessary. This unit does not cover the skills for the assembly of fabricated engineering components. These skills are covered by MEM18006C Repair and fit engineering components. Assembly using pre-constructed jigs is covered by MEM03001B Perform manual production assembly or

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	MEM03003B Perform sheet and plate assembly. Where welds are required to meet legislative or regulatory requirements, then appropriate welding units should also be selected. **Band**: **A** **Unit Weight**: **8**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		
Path 1	MEM05005B	Carry out mechanical cutting
	MEM05007C	Perform manual heating and thermal cutting
	MEM05012C	Perform routine manual metal arc welding
	MEM05015D	Weld using manual metal arc welding process
	MEM05051A	Select welding processes
	MEM05052A	Apply safe welding practices
	MEM09002B	Interpret technical drawing
	MEM12023A	Perform engineering measurements
	MEM18001C	Use hand tools
	MEM18002B	Use power tools/hand held operations
Path 2	MEM05005B	Carry out mechanical cutting

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Prerequisite units		
	MEM05007C	Perform manual heating and thermal cutting
	MEM05019D	Weld using gas tungsten arc welding process
	MEM05049B	Perform routine gas tungsten arc welding
	MEM05051A	Select welding processes
	MEM05052A	Apply safe welding practices
	MEM09002B	Interpret technical drawing
	MEM12023A	Perform engineering measurements
	MEM18001C	Use hand tools
	MEM18002B	Use power tools/hand held operations
Path 3	MEM05004C	Perform routine oxy acetylene welding
	MEM05005B	Carry out mechanical cutting
	MEM05007C	Perform manual heating and thermal cutting
	MEM05022C	Perform advanced welding using oxy acetylene welding process
	MEM05051A	Select welding processes
	MEM05052A	Apply safe welding practices
	MEM09002B	Interpret technical drawing
	MEM12023A	Perform engineering measurements
	MEM18001C	Use hand tools
	MEM18002B	Use power tools/hand held operations
Path 4	MEM05005B	Carry out mechanical cutting

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Prerequisite units		
	MEM05007C	Perform manual heating and thermal cutting
	MEM05017D	Weld using gas metal arc welding process
	MEM05050B	Perform routine gas metal arc welding
	MEM05051A	Select welding processes
	MEM05052A	Apply safe welding practices
	MEM09002B	Interpret technical drawing
	MEM12023A	Perform engineering measurements
	MEM18001C	Use hand tools
	MEM18002B	Use power tools/hand held operations

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Identify assembly method and construct jigs if required	1.1. Method is identified and jigs are constructed from engineering drawings or according to workshop practice 1.2. Distortion prevention/control techniques are correctly applied
2. Ensure all components for assembly are available	2.1. All components are checked against drawings and material list
3. Select tools and fixtures for fabrication assembly	3.1. Most appropriate equipment is selected
4. Assemble fabricated components	4.1. Material and/or fabricated components are correctly positioned 4.2. Jigs, fixtures, tools and measuring equipment are correctly adjusted and applied 4.3. Datum line is correctly determined if necessary 4.4. Assembled components are checked for position including squareness, level and alignment to specification 4.5. Fixing/joining techniques are applied as necessary according to standard operating procedures 4.6. Assembly is checked for compliance with drawing 4.7. Codes/standards are interpreted and applied

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Required skills include: • constructing jigs where appropriate • applying distortion prevention/control techniques • positioning components in accordance with drawing/specifications

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REQUIRED SKILLS AND KNOWLEDGE
• using jigs, fixtures, tools and equipment • correctly marking the datum line • checking the position of all assembled components visually and dimensionally • using appropriate fixing/joining techniques
Required knowledge
Required knowledge includes: • methods for assembly of fabricated components • jigs construction • effects of distortion of fabricated components • distortion prevention techniques • drawing and material list • characteristics of relevant tools and equipment squareness, level and alignment • function of datum lines • variety of fixing/joining techniques • defects associated with the assembly of fabricated components • methods of rectification of defects by rework or adjustment • requirements of relevant codes/standards

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to safely assemble general fabricated components in plate, pipe and section or sheet to specifications and drawings using accepted engineering trade techniques, practices, processes and workplace procedures. Competency in this unit cannot be awarded until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently apply the skills covered in this unit of competency in new and different situations and contexts. Critical aspects of assessment and evidence

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EVIDENCE GUIDE	
	include: • planning assembly tasks and sequences • determining and implementing appropriate distortion control techniques • assembling general fabricated components in plate, pipe,section or sheet to specifications, codes, occupational health and safety (OHS) regulations and standard operating procedures • demonstrating safe working practices at all times • ability to assemble components in a workshop and site environment
Context of and specific resources for assessment	This unit has been developed to support training in and recognition of trade level competency in assembly of fabricated components as applied to a sheet metal or metal fabrication environment. Assessment should emphasise a workplace context and procedures found in the candidate's workplace. The competencies covered by this unit can be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate.
Method of assessment	Typically, persons engaged in Engineering Tradesperson - Fabrication work are required to use their fabricated assembly skills and techniques across a range of jobs and specifications. A single assessment event is not appropriate. On the job assessment should be included as part of the assessment process wherever possible. Where assessment occurs off the job, judgement must consider evidence of the candidate's performance in a productive work environment that includes a sufficient range of appropriate tasks and materials to cover the scope of application for this unit. Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate

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EVIDENCE GUIDE	
	must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with the assembly of fabricated components or other units requiring the exercise of the skills and knowledge covered by this unit. Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Distortion prevention/control techniques	Distortion prevention/control techniques may include: • jigs • fixtures • heat • clamps
Components	Components may include general fabricated components in either plate, pipe and section or sheet
Alignment	Alignment may include typical structural alignment and levelling using planes and line straight edges, spirit levels, line levels and

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RANGE STATEMENT	
	squares
Fixing/joining techniques	Fixing/joining techniques may include: • welding • adhesives • fasteners • rivets
Codes/standards	All work carried out in accordance with legislative and regulatory requirements

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Fabrication

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MEM05012C Perform routine manual metal arc welding

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers preparing the materials and carrying out routine manual metal arc welding (MMAW).

Application of the Unit

Application of the unit	This unit applies in a maintenance or manufacturing environment where the welding is not required to meet an Australian standard or equivalent. Fillet and butt welds would typically be performed on low carbon/mild steels. Where welding is required to AS 1554 General Purpose or equivalent codes, occupational health and safety regulations and/or licensing requirements, Unit MEM05015D (Weld using manual metal arc welding process) should be selected. **Band**: **A** **Unit Weight**: **2**

Licensing/Regulatory Information

Refer to Application of the Unit

Pre-Requisites

Prerequisite units		

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Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Identify weld requirements	1.1. Weld requirements are identified from job instructions. 1.2. Location of welds is identified in accordance with standard operating procedures and job specifications.
2. Prepare materials for welding	2.1. Materials are cleaned and prepared ready for welding.
3. Prepare equipment for welding	3.1. Welding equipment is set up correctly. 3.2. Correct electrodes are selected to suit application and settings.
4. Perform routine welding using MMAW	4.1. Safe welding practices are applied. 4.2. Materials are welded to job requirements. 4.3. Welds are cleaned in accordance with standard operating procedures.

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in: • preparing materials and electrodes • setting up welding equipment • welding with MMAW • reading and interpreting routine information on written job instructions, specifications and standard operating procedures • performing measurements for joint preparation and routine MMAW
Required knowledge
Look for evidence that confirms knowledge of: • material and equipment preparation • properties and characteristics of materials and consumables • weld characteristics • equipment set-up and settings • MMAW processes and properties • post-welding treatments • safe welding practices • use and application of personal protective equipment

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to prepare materials and carry out routine manual metal arc welding (MMAW).

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EVIDENCE GUIDE	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both. Where assessment occurs off the job, i.e. the candidate is not in productive work, then appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with performing routine manual metal arc welding or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning should not require language, literacy and numeracy skills beyond those required in this unit. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT

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RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Materials	Low and mild carbon steel or similar
Prepared	Cleaning, setting up jigs, fixtures, clamps, joint preparation
Welding equipment	Welding leads, welding machines, electrode holder etc.
Cleaned	Slag and spatter, cleaning, using files and grinders

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Fabrication

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MEM05015D Weld using manual metal arc welding process

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit of competency covers the preparation, positioning, fixing, and manual welding techniques associated with general trade level welding using manual metal arc welding (MMAW) equipment including the selection and set up of the equipment appropriate to both the material and the weld to be performed, carrying out the MMAW to prescribed standards, and examining for and correcting defects, in a range of welded fabrications.

Application of the Unit

Application of the unit	This unit of competency applies to welds associated with heavy or light metal fabrications. Welds are fillet and butt welds in all positions on a range of ferrous and non-ferrous materials that may include carbon steel or stainless steel. Weld quality would conform to Australian Standard 1554 General Purpose, American Bureau of Shipping (ABS) or equivalent. This unit has been primarily developed for Engineering Tradesperson - Fabrication apprenticeship training and the recognition of trade level skills in MMAW. It may also apply to other trade occupations requiring higher level MMAW welding skills. Where manual thermal processes associated with preparation, pre-heat and/or post-heat are required, MEM05007C Perform manual heating and thermal cutting and/or MEM05008C Perform advanced manual thermal cutting, gouging and shaping should be considered for selection. **Band**: **A** **Unit Weight**: **4**

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Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		
Path 1	MEM05012C	Perform routine manual metal arc welding
	MEM05051A	Select welding processes
	MEM05052A	Apply safe welding practices
	MEM12023A	Perform engineering measurements
	MEM18001C	Use hand tools
	MEM18002B	Use power tools/hand held operations

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Prepare materials for manual metal arc welding (MMAW)	1.1. Weld requirements are identified from specifications and/or drawings 1.2. Materials are correctly prepared 1.3. Materials are assembled/aligned to specification, where required
2. Select welding equipment and consumables	2.1. Welding equipment and electrodes appropriate to the material and the weld are identified and selected
3. Assemble and set up welding equipment	3.1. Welding equipment is assembled and set up
4. Minimise and rectify distortion	4.1. Appropriate distortion prevention measures are selected and applied 4.2. Distortion is rectified
5. Weld to job specification using MMAW	5.1. Weld deposit is to specification 5.2. Joints are cleaned to specifications
6. Ensure weld conformance	6.1. Defects are rectified with minimum loss of sound metal using correct techniques and tools 6.2. Weld joints are visually inspected for conformance to specifications
7. Where required, maintain weld records	7.1. Where required, weld records are completed correctly

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- identifying and interpreting welding specifications including appropriate standards e.g. Australian Standard 1554 General Purpose, American Bureau of Shipping (ABS) or equivalent
- selecting and using appropriate tools and equipment

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REQUIRED SKILLS AND KNOWLEDGE
• using a variety of welding machines and electrodes • identifying and rectifying weld defects • applying techniques for distortion prevention and rectification • cleaning welds • reading and interpreting information on sketches, written job instructions, specifications, standard operating procedures and engineering drawings • recording routine information including routine weld records related to MMAW onto proformas and standard workplace forms • following oral instructions • measurement skills relating to joint preparation and MMAW
Required knowledge
Required knowledge includes: • material preparation • joint preparations • electrode classification • causes of distortion for materials within the scope of this unit • causes of defects and methods of rectification • the relationships between amperage, electrode and material • safe welding practices • use and application of personal protective equipment for MMAW

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to prepare materials, select and set up the welding equipment, carry out MMAW and examine for and correct defects, in a range of welding activities associated with MMAW. Competency in this unit cannot be awarded until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate	Assessors must be satisfied that the candidate can competently and consistently apply the skills covered in

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EVIDENCE GUIDE	
competency in this unit	this unit of competency in new and different workplace situations and contexts. Critical aspects of assessment and evidence include: • following all safety procedures to protect self, other workers and members of the public • identifying and interpreting specifications for MMA welding including Australian Standard 1554 General Purpose • interpreting welding specifications including standard welding symbols used to show weld procedure • selecting appropriate weld preparation methods for material and position of welds. • preparing materials, setting up of jigs, fixtures, clamps,etc. and joint preparation including bevelling • consistently welding different ferrous and non-ferrous materials to AS 1554 General Purpose or equivalent • identifying defects as described in the range statement across a range of welded materials • rectifying defects.
Context of and specific resources for assessment	Welding to AS 1554 General Purpose or equivalent requires both theoretical knowledge and high level practical skills. The assessment process must be designed to identify consistent performance to the standard and the specifications across a range of materials and positions. The assessment must also identify a level of workplace performance in terms of defect rates and weld failure rates. It is recommended that assessment involve demonstrations of competency under both workshop and site conditions. This means that the ideal assessment environment is either on the job or a combination of both on and off the job. The competencies covered by this unit may be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate.
Method of assessment	Typically an Engineering Tradesperson - Fabrication and other tradespersons engaged in welding are required to exercise MMAW skills and techniques across a range of jobs and specifications. A single assessment event is not appropriate. On the job assessment should be included as part of the assessment

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EVIDENCE GUIDE	
	process wherever possible. Where assessment occurs off the job, judgement must consider evidence of the candidate's performance in a productive work environment that includes a sufficient range of appropriate tasks and materials to cover the scope of application for this unit. Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with welding using MMAW process or other units requiring the exercise of the skills and knowledge covered by this unit. Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.

Range Statement

RANGE STATEMENT
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

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RANGE STATEMENT	
Welds	Welds include fillet and butt welds carried out in all positions
Materials	Materials may include ferrous materials including carbon or stainless steel, as well as non-ferrous metals and alloys suitable for MMA welding
Prepared	Preparation of materials may include: • pre-heating • setting up of jigs, fixtures and clamps • joint preparation (e.g. bevelling)
Equipment	Equipment may include AC or DC welding machines
Distortion prevention measures	Distortion prevention measures may include: • pre heating • setting up of jigs, fixtures and clamps
Rectified	Rectified refers to oxy acetylene, air arc equipment and grinding devices
Defects	Defects may include: • porosity • slag inclusions • discontinuities • lack of penetration • undercut

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units	

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Co-requisite units		

Competency field

Competency field	Fabrication

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MEM05016C Perform advanced welding using manual metal arc welding process

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers preparing materials, selecting and setting up the welding equipment, carrying out advanced manual metal arc welding (MMAW), inspecting for and correcting defects, and maintaining the weld records.

Application of the Unit

Application of the unit	This unit applies to welds associated with a range of structural sections and/or plate and/or pipe for general fabrication. Weld quality would typically conform to Australian Standard 1554 Structural Purpose, Bureau Det Norse Verticas or equivalent. Where advanced manual thermal cutting, gouging and shaping is carried out, Unit MEM05008C (Perform advanced manual thermal cutting, gouging and shaping) should also be selected. **Band**: **A** **Unit Weight**: **4**

Licensing/Regulatory Information

Not Applicable

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Pre-Requisites

Prerequisite units		
Path 1	MEM05007C	Perform manual heating and thermal cutting
	MEM05012C	Perform routine manual metal arc welding
	MEM05015D	Weld using manual metal arc welding process
	MEM05051A	Select welding processes
	MEM05052A	Apply safe welding practices
	MEM09002B	Interpret technical drawing
	MEM12023A	Perform engineering measurements
	MEM18001C	Use hand tools
	MEM18002B	Use power tools/hand held operations

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Prepare welding materials and equipment	1.1. Welding equipment is prepared. 1.2. Welding equipment appropriate to task requirements is assembled and adjusted correctly and safely. 1.3. Materials are prepared to achieve the required weld specification.
2. Weld joints to code requirements using MMAW	2.1. Weld requirements are interpreted correctly. 2.2. Welds are deposited correctly to specifications. 2.3. Appropriate distortion prevention measures are selected for the weld type and material and distortions are rectified as required.
3. Assess weld quality and rectify faults	3.1. Weld joints are visually inspected against specifications. 3.2. Defects are removed using appropriate methods for the given task. 3.3. Weld records are correctly completed and maintained.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Look for evidence that confirms skills in:

- welding to conform to Australian Standard 1554 Structural Purpose, Bureau Det Norse Verticas or equivalent
- interpreting weld requirements and specifications
- entering information onto proformas and standard workplace forms
- interpreting technical drawings and weld specifications relating to advanced MMAW
- using hand and power tools to prepare and weld material using MMAW
- using measurement and numeracy skills relating to advanced MMAW and preparation
- selecting equipment and consumables appropriate to the task
- using visual identification of faults/defects

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REQUIRED SKILLS AND KNOWLEDGE
Required knowledge
Look for evidence that confirms knowledge of: • in-depth knowledge of the properties and characteristics of a wide range of materials • requirements to conform to Australian Standard 1554 Structural Purpose, Bureau Det Norse Verticas or equivalent • weld procedures and requirements • different welder identification systems such as numbering, bar coding, paint coding, letter stamps • safety requirements • safe welding practices • use and application of personal protective equipment for MMAW

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to prepare materials, select and set up the welding equipment, carry out advanced MMAW, inspect for and correct defects, and maintain the weld records. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this

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EVIDENCE GUIDE	
	unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with performing advanced welding using manual metal arc welding process (MMAW), or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Welding equipment	AC or DC welding machines, settings, electrodes and related equipment
Materials	Materials used would include low carbon, cast

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RANGE STATEMENT	
	iron, stainless and low alloy steel
Prepared	Preparation of materials may include preheating, setting up of jigs, fixtures, clamps, etc., joint preparation e.g. bevelling
Welds	Welds would be fillet and butt in all positions
Distortion prevention measures	Distortion prevention may include preheating, setting up of jigs, fixtures, clamps, etc.
Defects	Porosity, slag inclusions, discontinuities, lack of penetration, undercut
Appropriate methods	Oxy acetylene and air arc equipment and grinding devices
Weld records	Proformas and other standard workplace forms

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Fabrication

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MEM05017D Weld using gas metal arc welding process

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit of competency covers the preparation, positioning, fixing, and manual welding techniques associated with general trade level welding using gas metal arc welding (GMAW) equipment including the selection and set up of the equipment appropriate to both the material and the weld to be performed, carrying out the GMAW to prescribed standards, and examining for and correcting defects, in a range of welded fabrications.

Application of the Unit

Application of the unit	This unit of competency applies to welds associated with heavy or light metal fabrications. Welds are fillet and butt welds in all positions on a range of ferrous and non-ferrous materials that may include carbon steel or stainless steel. Weld quality would conform to Australian Standard 1554 General Purpose, American Bureau of Shipping (ABS) or equivalent. This unit has been primarily developed for Engineering Tradesperson - Fabrication apprenticeship training and the recognition of trade level skills in GMAW. It may also apply to other trade occupations requiring higher level GMAW welding skills. Where manual thermal processes associated with preparation, pre-heat and/or post-heat are required, MEM05007C Perform manual heating and thermal cutting and/or MEM05008C Perform advanced manual thermal cutting, gouging and shaping should be considered for selection. **Band**: **A** **Unit Weight**: **4**

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Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		
Path 1	MEM05050B	Perform routine gas metal arc welding
	MEM05051A	Select welding processes
	MEM05052A	Apply safe welding practices
	MEM12023A	Perform engineering measurements
	MEM18001C	Use hand tools
	MEM18002B	Use power tools/hand held operations

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Prepare materials for gas metal arc welding (GMAW)	1.1. Weld requirements are identified from specifications and/or drawings 1.2. Material is correctly prepared 1.3. Materials are assembled/aligned to specification where required
2. Select welding components and consumables	2.1. Welding machine settings, accessories and consumables are identified and selected
3. Assemble and set up welding equipment	3.1. Welding equipment is assembled and set up
4. Minimise and rectify distortion	4.1. Appropriate distortion prevention measures are selected and applied 4.2. Distortion is rectified
5. Weld to job specification using GMAW	5.1. Weld deposit is to specifications 5.2. Joints are cleaned to specifications
6. Ensure weld conformance	6.1. Weld joints are visually inspected for conformance to specifications 6.2. Defects are removed with minimum loss of sound metal using correct and appropriate techniques and tools
7. Maintain weld records as required	7.1. Weld records are completed correctly

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- identifying and interpreting welding specifications including appropriate standards e.g. Australian Standard 1554 General Purpose, American Bureau of Shipping (ABS) or equivalent
- selecting and using appropriate tools and equipment

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REQUIRED SKILLS AND KNOWLEDGE
• using a variety of welding machines and electrodes • identifying and rectifying weld defects • applying techniques for distortion prevention and rectification • cleaning welds • reading and interpreting information on sketches, written job instructions, specifications, standard operating procedures and engineering drawings • recording routine information including routine weld records related to GMAW onto proformas and standard workplace forms • following oral instructions • measurement skills relating to joint preparation and GMAW
Required knowledge
Required knowledge includes: • types of gases and their uses • the relationships between amperage/wire feed, voltage, gas flow, electrode and material • the application of weld metal transfer (short arc, spray etc.) • correct welding machine, leads, hand pieces and electrodes • material preparation • joint preparations • electrode classification • causes of distortion for materials within the scope of this unit • safe welding practices • use and application of personal protective equipment for GMAW

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to prepare materials, select and set up the welding equipment, carry out GMAW and examine for and correct defects, in a range of welding activities associated with GMAW. Competency in this unit cannot be awarded until all prerequisites have been satisfied.

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EVIDENCE GUIDE	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently apply the skills covered in this unit of competency in new and different workplace situations and contexts. Critical aspects of assessment and evidence include: • following all safety procedures to protect self, other workers and members of the public • identifying and interpreting specifications for GMAW including Australian Standard 1554 General Purpose • interpreting welding specifications including standard welding symbols used to show weld procedure • selecting appropriate weld preparation methods for material and position of welds. • preparing materials, setting up of jigs, fixtures, clamps,etc. and joint preparation including bevelling • consistently welding different ferrous and non-ferrous materials to AS 1554 General Purpose or equivalent • identifying defects as described in the range statement across a range of welded materials • rectifying defects.
Context of and specific resources for assessment	Welding to AS 1554 General Purpose or equivalent requires both theoretical knowledge and high level practical skills. The assessment process must be designed to identify consistent performance to the standard and the specifications across a range of materials and positions. The assessment must also identify a level of workplace performance in terms of defect rates and weld failure rates. It is recommended that assessment involve demonstrations of competency under both workshop and site conditions. This means that the ideal assessment environment is either on the job or a combination of both on and off the job. The competencies covered by this unit may be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate.
Method of assessment	Typically an Engineering Tradesperson - Fabrication and other tradespersons engaged in welding are required to exercise GMAW skills and techniques across a range of jobs and specifications.

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EVIDENCE GUIDE	
	A single assessment event is not appropriate. On the job assessment should be included as part of the assessment process wherever possible. Where assessment occurs off the job, judgement must consider evidence of the candidate's performance in a productive work environment that includes a sufficient range of appropriate tasks and materials to cover the scope of application for this unit. Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with welding using GMAW process or other units requiring the exercise of the skills and knowledge covered by this unit. Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.

Range Statement

RANGE STATEMENT
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work

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RANGE STATEMENT	
situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Weld	Welds include fillet and butt welds carried out in all positions
Materials	Materials may include ferrous materials including carbon or stainless steel, as well as non-ferrous metals and alloys suitable for GMAW
Prepared	Preparation of materials may include: • pre-heating • setting up of jigs, fixtures and clamps • joint preparation (e.g. bevelling)
Equipment	Equipment may include AC or DC welding machines
Distortion prevention measures	Distortion prevention measures may include: • pre-heating • setting up of jigs, fixtures and clamps
Rectified	Rectified refers to oxy acetylene, air arc equipment and grinding devices
Defects	Defects may include: • porosity • slag inclusions • discontinuities • lack of penetration • undercut

Unit Sector(s)

Unit sector	

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Co-requisite units

Co-requisite units		

Competency field

Competency field	Fabrication

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MEM05018C Perform advanced welding using gas metal arc welding process

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers preparing materials, selecting and setting up the welding equipment, carrying out advanced gas metal arc welding (GMAW), inspecting for and correcting defects, and maintaining the weld records.

Application of the Unit

Application of the unit	This unit applies to welds associated with a range of structural sections and/or plate and/or pipe for general fabrication using ferrous and non-ferrous materials. Weld quality would typically conform to Australian Standard 1554 Structural Purpose, Bureau Det Norse Verticas or equivalent. Where advanced manual thermal cutting, gouging and shaping is carried out, Unit MEM05008C (Perform advanced manual thermal cutting, gouging and shaping) should also be selected. **Band**: **A** **Unit Weight**: **4**

Licensing/Regulatory Information

Not Applicable

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Pre-Requisites

Prerequisite units		
Path 1	MEM05007C	Perform manual heating and thermal cutting
	MEM05017D	Weld using gas metal arc welding process
	MEM05050B	Perform routine gas metal arc welding
	MEM05051A	Select welding processes
	MEM05052A	Apply safe welding practices
	MEM09002B	Interpret technical drawing
	MEM12023A	Perform engineering measurements
	MEM18001C	Use hand tools
	MEM18002B	Use power tools/hand held operations

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Prepare welding materials and equipment	1.1. Welding equipment is prepared. 1.2. Welding equipment is assembled and adjusted correctly and safely. 1.3. Materials are prepared to achieve required weld specification.
2. Weld joints to code requirements using advanced GMAW	2.1. Weld requirements are interpreted correctly. 2.2. Welds are deposited correctly to specifications. 2.3. Appropriate distortion prevention measures are selected and distortions are rectified as required.
3. Assess weld quality and rectify faults	3.1. Weld joints are visually inspected against specifications. 3.2. Defects are removed using appropriate methods for the given task.. 3.3. Weld records are correctly completed and maintained.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Look for evidence that confirms skills in:

- welding to conform to Australian Standard 1554 Structural Purpose, Bureau Det Norse Verticas or equivalent
- performing safe welding practices
- using and applying personal protective equipment for GMAW
- interpreting weld requirements and specifications
- entering information onto proformas and standard workplace forms
- interpreting technical drawings and weld specifications relating to advanced GMAW
- using hand and power tools to prepare and weld material using GMAW
- using measurement and numeracy skills relating to advanced GMAW and preparation
- selecting equipment and consumables appropriate to the task

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REQUIRED SKILLS AND KNOWLEDGE
• using visual identification of faults/defects
Required knowledge
Look for evidence that confirms knowledge of: • in-depth knowledge of the properties and characteristics of a wide range of materials • requirements to conform to Australian Standard 1554 Structural Purpose, Bureau Det Norse Verticas or equivalent • weld procedures and requirements • different welder identification systems such as numbering, bar coding, paint coding, letter stamps • safe welding practices • use and application of personal protective equipment for GMAW

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to prepare materials, select and set up the welding equipment, carry out advanced GMAW, inspect for and correct defects, and maintain the weld records. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this

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EVIDENCE GUIDE	
	unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with performing advanced welding using gas metal arc welding process or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Welding equipment	AC or DC welding machines, settings, electrodes and related equipment
Preparing materials	Preheating, setting up of jigs, fixtures, clamps, etc., joint preparation e.g. bevelling

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RANGE STATEMENT	
Materials	Low carbon, cast iron, stainless and low alloy steel, aluminium and aluminium alloys
Welds	Fillet and butt in all positions
Distortion prevention measures	Preheating, setting up of jigs, fixtures, clamps, etc.
Defects	Porosity, slag inclusions, discontinuities, lack of penetration, undercut
Appropriate methods	Oxy acetylene arc equipment, grinding devices
Weld records	Proformas and other standard workplace forms

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Fabrication

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MEM05019D Weld using gas tungsten arc welding process

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit of competency covers the preparation, positioning, fixing, and welding techniques associated with general trade level welding using gas tungsten arc welding (GTAW) equipment including the selection and set up of the equipment appropriate to both the material and the weld to be performed, carrying out the GTAW to prescribed standards, and examining for and correcting defects, in a range of welded fabrications.

Application of the Unit

Application of the unit	This unit of competency applies to welds associated with heavy or light metal fabrications. Welds are fillet and butt welds in all positions on a range of ferrous and non-ferrous materials that may include carbon steel or stainless steel and aluminium. Weld quality would conform to Australian Standard 1554 General Purpose, American Bureau of Shipping (ABS), or equivalent. This unit has been primarily developed to support Engineering Tradesperson - Fabrication apprenticeship training and the recognition of trade level skills in GTAW. It may also apply to other trade occupations requiring higher level GTAW welding skills. Where manual thermal processes associated with preparation, pre-heat and/or post-heat are required, MEM05007C Perform manual heating and thermal cutting and/or MEM05008C Perform advanced manual thermal cutting, gouging and shaping should be considered for selection. **Band**: **A** **Unit Weight**: **4**

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Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		
Path 1	MEM05049B	Perform routine gas tungsten arc welding
	MEM05051A	Select welding processes
	MEM05052A	Apply safe welding practices
	MEM12023A	Perform engineering measurements
	MEM18001C	Use hand tools
	MEM18002B	Use power tools/hand held operations

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Prepare materials for gas tungsten arc welding (GTAW)	1.1. Weld requirements are identified from specifications and/or drawings 1.2. Material is correctly prepared 1.3. Materials are assembled/aligned to specification, where required
2. Select welding equipment and consumables	2.1. Welding equipment and electrodes, accessories and consumables appropriate to the material are identified and selected
3. Assemble and set up welding equipment	3.1. Welding equipment is assembled and set up
4. Minimise and rectify distortion	4.1. Appropriate distortion prevention measures for weld and material type are selected and applied 4.2. Distortion is rectified
5. Weld to job specification using GTAW	5.1. Weld deposit is to specifications 5.2. Joints are cleaned to specifications
6. Ensure weld conformance	6.1. Defects are removed with minimum loss of sound metal using techniques and tools appropriate to the defect, material and process 6.2. Weld joints are visually inspected for conformance to specifications
7. Maintain weld records as required	7.1. Weld records are completed correctly

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- identifying and interpreting welding specifications including appropriate standards e.g. Australian Standard 1554 General Purpose, American Bureau of Shipping (ABS) or equivalent
- selecting and using appropriate tools and equipment

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REQUIRED SKILLS AND KNOWLEDGE
• using a variety of welding machines and electrodes • identifying and rectifying weld defects • applying techniques for distortion prevention and rectification • cleaning welds • reading and interpreting information on sketches, written job instructions, specifications, standard operating procedures and engineering drawings • recording routine information including routine weld records related to GTAW onto proformas and standard workplace forms • following oral instructions • measurement skills relating to joint preparation and GTAW
Required knowledge
Required knowledge includes: • correct welding machine, leads, hand pieces and electrodes • material preparation • joint preparations • electrode classification • causes of distortion for materials within the scope of this unit • causes of defects and methods of rectification • the relationships between amperage, electrode and material • types of gases and their uses • types of electrodes, current settings and high frequency voltage • filler materials and consumables • safe welding practices • use and application of personal protective equipment for GTAW

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to prepare materials, select and set up the welding equipment, carry out the GTAW welding and examine for and correct defects, in a range of welding activities associated with GTAW. Competency in this unit cannot

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EVIDENCE GUIDE	
	be awarded until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently apply the skills covered in this unit of competency in new and different workplace situations and contexts. Critical aspects of assessment and evidence include: • following all safety procedures to protect self, other workers and members of the public • identifying and interpreting specifications for GTAW including Australian Standard 1554 General Purpose • interpreting welding specifications including standard welding symbols used to show weld procedure • selecting appropriate weld preparation methods for material and position of welds. • preparing materials, setting up of jigs, fixtures, clamps,etc. and joint preparation including bevelling • consistently welding different ferrous and non-ferrous materials to AS 1554 General Purpose or equivalent • identifying defects as described in the range statement across a range of welded materials • rectifying defects.
Context of and specific resources for assessment	Welding to AS 1554 General Purpose or equivalent requires both theoretical knowledge and high practical skills. The assessment process must be designed to identify consistent performance to standard and specification across a range of materials and positions. The assessment must also identify a level of workplace performance in terms of defect rate and weld failure rates. It is recommended that assessment involve demonstrations of competency under both workshop and site conditions. This means that the ideal assessment environment is either on the job or a combination of both on and off the job. The competencies covered by this unit may be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate.
Method of assessment	Typically an Engineering Tradesperson - Fabrication and other tradespersons engaged in welding are required to exercise GTAW skills and techniques across a range of

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EVIDENCE GUIDE	
	jobs and specifications. A single assessment event is not appropriate. On the job assessment should be included as part of the assessment process wherever possible. Where assessment occurs off the job, judgement must consider evidence of the candidate's performance in a productive work environment that includes a sufficient range of appropriate tasks and materials to cover the scope of application for this unit. Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with welding using GTAW process or other units requiring the exercise of the skills and knowledge covered by this unit. Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.

Range Statement

RANGE STATEMENT
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating

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RANGE STATEMENT	
conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Prepared	Prepared may include: • pre-heating • setting up of jigs, fixtures and clamps • joint preparation (e.g. bevelling)
Welds	Welds include fillet and butt welds carried out in all positions
Materials	Materials may include ferrous and non-ferrous materials including carbon steel,stainless steel, aluminium and other materials suitable for GTAW welding
Welding equipment	Welding equipment may include AC or DC welding machines
Distortion prevention measures	Distortion prevention measures may include: • pre-heating • setting up of jigs, fixtures and clamps
Rectified	Rectified may include: • oxy acetylene and air arc equipment • grinding devices
Defects	Defects may include: • porosity • slag inclusions • discontinuities • lack of penetration • undercut

Unit Sector(s)

Unit sector	

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Co-requisite units

Co-requisite units		

Competency field

Competency field	Fabrication

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MEM05020C Perform advanced welding using gas tungsten arc welding process

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers preparing materials, selecting and setting up the welding equipment, carrying out advanced gas tungsten arc welding (GTAW), inspecting for and correcting defects, and maintaining the weld records.

Application of the Unit

Application of the unit	This unit applies to welds associated with a range of structural sections and/or plate and/or pipe for general fabrication. Weld quality would typically conform to Australian Standard 1554 Structural Purpose, Bureau Det Norse Verticas or equivalent. **Band**: **A** **Unit Weight**: **4**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		
Path 1	MEM05007C	Perform manual heating and thermal cutting

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Prerequisite units		
	MEM05019D	Weld using gas tungsten arc welding process
	MEM05049B	Perform routine gas tungsten arc welding
	MEM05051A	Select welding processes
	MEM05052A	Apply safe welding practices
	MEM09002B	Interpret technical drawing
	MEM12023A	Perform engineering measurements
	MEM18001C	Use hand tools
	MEM18002B	Use power tools/hand held operations

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**

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ELEMENT	PERFORMANCE CRITERIA
1. Prepare welding materials and equipment	1.1. Welding equipment is prepared. 1.2. Welding equipment appropriate to task requirements is assembled and adjusted correctly and safely. 1.3. Materials are prepared to achieve the required weld specification.
2. Weld joints to code requirements using advanced GTAW	2.1. Weld requirements are interpreted correctly, 2.2. Welds are deposited correctly to specifications. 2.3. Appropriate distortion prevention measures are selected for the weld type and material and distortions are rectified as required.
3. Assess weld quality and rectify faults	3.1. Weld joints are visually inspected against specifications. 3.2. Defects are removed using appropriate methods for the given task. 3.3. Weld records are correctly completed and maintained.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Look for evidence that confirms skills in:

- welding to conform to Australian Standard 1554 Structural Purpose, Bureau Det Norse Verticas or equivalent
- interpreting technical drawings and weld specifications relating to advanced GTAW
- using hand and power tools to prepare and weld material using GTAW
- using measurement and numeracy skills relating to advanced GTAW and preparation
- selecting equipment and consumables appropriate to task
- using visual identification of faults/defects

Required knowledge

Look for evidence that confirms knowledge of:

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REQUIRED SKILLS AND KNOWLEDGE
• in-depth knowledge of the properties and characteristics of a wide range of materials • requirements to conform to Australian Standard 1554 Structural Purpose, Bureau Det Norse Verticas or equivalent • weld procedures and requirements • different welder identification systems such as numbering, bar coding, paint coding, letter stamps • safe welding practices • use and application of personal protective equipment for GTAW • hazards and control measures related to GTAW

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to prepare materials, select and set up the welding equipment, carry out the GTAW welding and inspect for and correct defects and maintain welding records. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate.

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EVIDENCE GUIDE	
	This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with performing advanced welding using gas tungsten arc welding process (GTAW) or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Equipment	AC or DC welding machines, gases, settings, electrodes and related equipment
Materials	Low carbon, cast iron, stainless and low alloy steel, aluminium
Prepared	Preheating, setting up of jigs, fixtures, clamps, etc., joint preparation e.g. bevelling

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RANGE STATEMENT	
Welds	Fillet and butt in all positions
Distortion prevention measures	Preheating, setting up of jigs, fixtures, clamps, etc.
Defects	Porosity, slag inclusions, discontinuities, lack of penetration, undercut
Appropriate methods	Oxy acetylene, air arc equipment and grinding devices
Weld records	Proformas and other standard workplace forms

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Fabrication

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MEM05022C Perform advanced welding using oxy acetylene welding process

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers performing advanced oxy acetylene welding, carried out using a range of materials for general fabrication.

Application of the Unit

Application of the unit	This unit applies to comprehensive preparation as required in a range of environments. It also includes maintaining weld records and rectifying defects. The term 'oxy acetylene' is used here to describe a range of fuel gases, including acetylene, LPG, hydrogen etc. This unit covers the competencies required for welding quality that would meet the Australian Standard 1554 Special Purpose, appropriate industrial standards, or equivalent outcomes. Where welds comply with one of the certificates covered by Australian Standard 1796, then Unit MEM05026C (Apply welding principles) should also be selected. Where advanced manual thermal cutting, gouging and shaping is carried out, Unit MEM05008C (Perform advanced manual thermal cutting, gouging and shaping) should also be selected. **Band**: **A** **Unit Weight**: **6**

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Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		
Path 1	MEM05004C	Perform routine oxy acetylene welding
	MEM05007C	Perform manual heating and thermal cutting
	MEM05051A	Select welding processes
	MEM05052A	Apply safe welding practices
	MEM09002B	Interpret technical drawing
	MEM18001C	Use hand tools
	MEM18002B	Use power tools/hand held operations

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Select welding equipment and consumables	1.1. Correct welding equipment and consumables are selected from weld procedure specifications.
2. Prepare welding materials and equipment	2.1. Welding equipment and consumables are prepared according to job requirements. 2.2. Welding equipment appropriate to the task is assembled and adjusted correctly and safely. 2.3. Materials are prepared to achieve required weld specification.
3. Assemble welding equipment	3.1. Welding equipment, including cylinders, regulators, hoses, torches and tips is assembled and set up safely in accordance with standard operating procedures.
4. Weld joints to Australian Standard 1554 SP or equivalent	4.1. Materials are welded to Australian Standard 1554 SP or equivalent in all positions. 4.2. Instructions, symbols, specifications are interpreted correctly including bead size, bead placement, reinforcement etc. and in accordance with weld procedure sheet, if available, and standard operating procedures.
5. Inspect welds	5.1. Weld joints are visually inspected against specifications. 5.2. Weld defects are identified.
6. Correct faults	6.1. Defects are removed with minimum loss of sound metal using correct and appropriate techniques and tools to Australian Standard 3992 or equivalent.
7. Maintain weld records	7.1. Weld records are maintained in accordance with specifications and standard operating procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in:

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REQUIRED SKILLS AND KNOWLEDGE
• selecting equipment and consumables • assembling welding equipment • welding to AS1554 SP • inspecting welds to specification • correcting weld faults to AS3992 • entering information on to proformas and standard workplace forms • using hand and power tools to prepare and weld materials • interpreting weld requirements and specifications/procedures • using measurement and numeracy skills for advanced oxy acetylene welding • selecting equipment and consumables appropriate to given task • using visual identification of defects/faults
Required knowledge
Look for evidence that confirms knowledge of: • preparatory requirements • the purpose and examples of pre-welding and post-welding heating of the weld materials • the appropriate settings for the given task and the selected equipment/consumables • the purpose of reinforcing areas to be welded • the methods of weld defect removal and their application • material and consumable properties and characteristics • requirements of AS1554SP and AS3992 or equivalent • fuel gas properties and applications • post treatments • recording procedures • safe welding practices • use and application of personal protective equipment for oxy acetylene welding • relevant hazards and control measures related to the competency

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must

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EVIDENCE GUIDE	
	be able to perform advanced oxy acetylene welding carried out using a range of materials for general fabrication. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with performing advanced welding using oxy acetylene welding process or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

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Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Equipment and consumables	Fuel gases, including acetylene, LPG, hydrogen etc., cylinders, regulators, hoses, torches, tips, range of filler rods and fluxes
Weld	Fillet and butt in the horizontal, vertical and overhead positions
Preparing materials	Preheating, setting up of jigs, fixtures, clamps, etc., joint preparation e.g. bevelling
Materials	Low carbon steel, plate, pipe, tube and round bar

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

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Competency field

Competency field	Fabrication

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MEM05024B Perform welding supervision

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers instructing and qualifying welders in accordance with weld procedures, and maintaining quality and safety procedures.

Application of the Unit

Application of the unit	Competencies in this unit are based on wide knowledge of welding science, processes, procedures and technical requirements. Individuals working in this field would hold at least one certificate satisfying the requirements of Australian Standard 1796 Certificate 1-9. The supervision, training and qualification of welders in welding procedures is defined by recognised codes and standards e.g. Australian Standard 2214 and Australian Standard 1796 Certificate 10. **Band**: **B** **Unit Weight**: **12**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		
Path 1	MEM05026C	Apply welding principles

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Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Determine and prepare welding procedure	1.1. Welders are instructed according to procedure. 1.2. Welding parameters are determined in accordance with procedures 1.3. Variables and sequence checks are planned against documentation. 1.4. Documentation is prepared for record keeping.
2. Qualify welders to required procedures	2.1. Welders are trained in relevant procedures. 2.2. Welders are tested against relevant procedures. 2.3. Welder performance reports against procedures are maintained.
3. Monitor/maintain quality assurance and safety procedures	3.1. Internal quality assurance plan is monitored. 3.2. Traceability of materials is ensured. 3.3. Welding is supervised to ensure compliance with prescribed specifications and/or documented

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ELEMENT	PERFORMANCE CRITERIA
	procedures and/or safety procedures.
4. Prepare documents	4.1. Procedure is recorded against pre-qualifying procedures. 4.2. Findings on internal quality assurance plan are recorded.
5. Arrange for non-destructive testing and destructive testing	5.1. Weld tests appropriate to the weld procedure are arranged. 5.2. Non-destructive testing/destructive testing reports are verified against job requirements and specifications.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Look for evidence that confirms skills in:

- individuals working in this field would hold at least one certificate satisfying the requirements of Australian Standard 1796 Certificate 1-9.
- welding to the procedure being supervised
- providing training to welders on welding procedures
- communicating to welders on welding requirements
- planning of weld procedures
- writing workplace welding procedures, recording information on proformas and other workplace documents/reports

Required knowledge

Look for evidence that confirms knowledge of:

- welding science, principles and effects of heat treatment
- welding terms, codes and symbols
- welding processes, parameters and relation to weld quality
- welding procedures defined by code and technical requirements
- non-destructive testing
- any applicable industry standards, national/Australian standards, NOHSC guides, State/Territory regulatory codes of practice/standards

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REQUIRED SKILLS AND KNOWLEDGE
• use and application of personal protective equipment for welding supervision • safe work practices and procedures

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to provide appropriate supervision to welding tasks and outcomes. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both. Where assessment occurs off the job, that is the candidate is not in productive work, appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with applying a wide knowledge of welding science, processes, procedures and technical requirements to the supervision process or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct

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EVIDENCE GUIDE	
	observation, supervisor's reports, project work, samples and questioning. Questioning should not require language, literacy and numeracy skills beyond those required in this unit. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Procedure	As defined by the relevant codes and/or standards
Documentation	As defined by the relevant codes and/or standards
Traceability	The materials used in a nominated weld can be traced to their source in accordance with standard operating procedures

Unit Sector(s)

Unit sector	

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Co-requisite units

Co-requisite units		

Competency field

Competency field	Fabrication

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MEM05025C Perform welding/fabrication inspection

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers performing welding/fabrication inspection by selecting, conducting or verifying appropriate non-destructive tests, establishing and validating welding procedures, ensuring quality assurance is carried out, and monitoring procedures.

Application of the Unit

Application of the unit	This unit applies to welding inspection based on knowledge of welding science and metallurgy, mechanical properties of welded joints, heat treatment procedures and national and technical standards. All work is undertaken in accordance with legislative and regulatory requirements. Test procedures and the range of this standard are determined by applicable Australian and/or international standards. **Band**: **B** **Unit Weight**: **12**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units	

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Prerequisite units		
Path 1	MEM05026C	Apply welding principles
	MEM12023A	Perform engineering measurements

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Select and organise/conduct appropriate non-destructive test procedures or verify previous test procedures	1.1. Appropriate non-destructive tests are selected and organised/conducted in accordance with standard operating procedures or job specifications. 1.2. Results of previous testing procedures are verified.
2. Establish welding procedure	2.1. Joint design specification is interpreted. 2.2. Parameters are described. 2.3. Variables are checked. 2.4. Procedures are documented.
3. Validate welding procedures	3.1. Preparation of a test piece is organised. 3.2. Prescribed tests are arranged or conducted.

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ELEMENT	PERFORMANCE CRITERIA
	3.3. Test results are interpreted and report is prepared identifying required action.
4. Ensure quality assurance procedures are carried out	4.1. Material identification is checked. 4.2. Movement of material through workshop in-site is documented. 4.3. Transferring material test certification numbers is witnessed. 4.4. Identification of consumables in accordance with welding procedures is performed. 4.5. Storage and use of consumables are monitored. 4.6. Quality records are maintained and reviewed to ensure compliance with requirements.
5. Monitor procedures in process	5.1. Material forming is checked. 5.2. Dimensional checks are carried out. 5.3. Final inspection is made against specifications.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in: • obtaining, interpreting and applying relevant job instructions, design and weld specifications, codes, standards and procedures • organising tests • initiating and conducting weld tests • obtaining and interpreting weld tests • obtaining and interpreting weld design data • verbally conveying, checking and clarifying information • checking weld parameters for conformance to specifications • documenting welding procedures • preparing test reports • recording movement of material through the workshop • producing test pieces • marking consumables for identification

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REQUIRED SKILLS AND KNOWLEDGE

- checking material for conformance to specifications
- using and storing welding consumables
- maintaining welding quality records
- checking welding records for conformance with welding quality requirements
- checking the form of the material to be welded for conformance with specifications
- using measurement skills for checking the dimensions of welded components
- performing relevant calculations

Required knowledge

Look for evidence that confirms knowledge of:

- hazards and control measures associated with welding/fabrication inspection
- safe work practices and procedures
- use and application of personal protective equipment
- types of non-destructive tests and their application
- welding procedures for the given weld
- tests/checks to be conducted
- arithmetic operations, formulae and calculations for testing welding/fabrications
- procedures for initiating the weld tests
- procedures for conducting a variety of non-destructive tests
- procedures for obtaining previous weld tests
- discrepancies between previous and current weld tests
- reasons for any identified discrepancies
- effects of testing procedures on test results
- procedures for verifying/amending previously established weld test procedures
- the parameters affecting the performance of the weld with respect to specifications
- variables affecting the performance of the weld
- tools, equipment and techniques necessary to check each variable
- procedures, tools, techniques and equipment necessary to check the form and dimensions of the welded components
- procedures for documenting welding procedures and preparing a weld test piece
- tools, equipment and techniques to carry out the prescribed tests
- procedures for initiating prescribed tests, obtaining test results, and reporting test result
- discrepancies between the test results and weld specifications
- action to be taken to return the welds produced to specification
- weld specifications
- methods of identifying weld materials
- reasons for correctly marking/identifying weld materials
- procedures for documenting/recording the movement of material through the workshop

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REQUIRED SKILLS AND KNOWLEDGE
• the reasons for documenting/recording the movement of material through the workshop • procedures for transferring material test certification numbers • person(s) who can witness the transfer of material test certification numbers • the reasons for witnessing the transfer of material test certification numbers • procedures for identifying consumables and reasons for marking consumables for identification purposes • procedures for using and storing consumables and the consequences of inappropriate use and/or storage of consumables • the storage life of consumables • procedures for maintaining welding quality records • the welding quality requirements of the relevant code, standard and/or welding procedure

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to perform welding/fabrication inspection. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment

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EVIDENCE GUIDE	
	should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with performing welding/fabrication inspection or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Non-destructive tests	Dye penetrant magnetic particle, radiographic or ultrasound tests

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Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Fabrication

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MEM05026C Apply welding principles

Modification History

Single band identifier removed to clarify dual status

Unit Descriptor

Unit descriptor	This unit of competency covers applying welding principles to meet the statutory and regulatory requirements for welding procedures generally associated with the application of one of the units satisfying Australian Standard 1796 Certificates 1-9.

Application of the Unit

Application of the unit	This unit of competency covers the underpinning knowledge required to satisfy Australian Standard 1796. It includes knowledge of welding terms, codes and symbols, the effects of heat treatment on metal as it relates to welding, and the logical sequence for a welding process required to be conducted to AS 1796. It covers welding, planning and set up principles for a range of materials and processes. This unit must be assessed in combination with one of the units satisfying the Australian Standard 1796 Certificates 1-9 and these units include: • MEM05042B Perform welds to code standards using flux core arc welding process • MEM05043B Perform welds to code standards using gas metal arc welding process • MEM05044B Perform welds to code standards using gas tungsten arc welding process • MEM05045B Perform pipe welds to code standards using manual metal arc welding process • MEM05046B Perform welds to code standards using manual metal arc welding process. This unit has been developed for Engineering Tradespersons - Fabrication in either apprenticeship or post trade training and the recognition of trade level

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	knowledge of welding principles. **Band:** This unit has dual status and is to be regarded as both a Specialisation Band A unit and Specialisation Band B unit for progression to C7 (AQF level IV). **Unit Weight**: **4**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Apply all statutory and regulatory requirements to welding procedures	1.1. Statutory and safety requirements are applied to welding
2. Interpret all welding terms, codes and symbols	2.1. Welding terms and symbols are correctly interpreted
3. Determine the effects of heat treatment on metal in relation to welding	3.1. Reasons for performing heat treatment are identified 3.2. Processes such as pre-heat/post-heat treatment, stress relieving, normalising and annealing are appropriately applied
4. Plan the logical sequence of welding operations	4.1. Principles of planning and setting up welding are applied 4.2. Where specified, welds are prepared for testing

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- interpreting welding specifications including terms, codes and symbols
- planning the sequence of welding operations

Required knowledge

Required knowledge includes:

- any applicable industry standards, national/Australian standards, NOHSC guidelines, state/territory regulatory codes of practice/standards for the applicable welding processes
- safe work practices and procedures
- hazards related to welding
- safety equipment and procedures related to welding activities
- welding terminology
- welding codes and symbols

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REQUIRED SKILLS AND KNOWLEDGE
• heat treatment processes • logical sequence for welding processes • tools, equipment, techniques used in welding • effect of heat treatment on metal

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to apply welding principles to meet the statutory and regulatory requirements for welding procedures.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently apply the skills and knowledge covered in this unit of competency in new and different workplace situations and contexts. Critical aspects of assessment and evidence include: • applying welding statutory and safety requirements to different welding jobs and environments • interpreting welding codes and symbols including symbols for type of weld, weld size, processing and finishing operations etc • applying appropriate pre and post-heat treatment processes for a range of welded materials • setting up weld sequence and preparing materials in a logical manner for welding job.
Context of and specific resources for assessment	This unit must be assessed in combination with one of the units satisfying the Australian Standard 1796 Certificates 1-9. Welding to AS 1796 requires both theoretical knowledge and high practical skills. The assessment process for the two units must be designed to identify consistent performance to the tandards, the code and specifications across a range of materials and positions. The assessment must also identify a workplace level of performance in terms of defect rates and weld

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EVIDENCE GUIDE	
	failure rates. It is recommended that assessment involve demonstrations of competency under both workshop and site conditions. This means that the ideal assessment environment is either on the job or a combination of both on and off the job. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate.
Method of assessment	Typically an Engineering Tradesperson - Fabrication and other tradespersons engaged in welding are required to apply welding principles and techniques across a range of jobs and specifications. A single assessment event is not appropriate. On the job assessment should be included as part of the assessment process wherever possible. Where assessment occurs off the job, judgement must consider evidence of the candidate's performance in a productive work environment that includes a sufficient range of appropriate tasks and materials to cover the scope of application for this unit. Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	This unit must be assessed in combination with one of the units satisfying the Australian Standard 1796 Certificate 1-9 and these units include: • MEM05042B Perform welds to code standards using flux core arc welding process • MEM05043B Perform welds to code standards using gas metal arc welding process • MEM05044B Perform welds to code standards using gas tungsten arc welding process

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EVIDENCE GUIDE	
	• MEM05045B Perform pipe welds to code standards using manual metal arc welding process • MEM05046B Perform welds to code standards using manual metal arc welding process. This unit could also be assessed in conjunction with any other units addressing the safety, quality, communication materials handling, recording and reporting associated with applying welding principles to meet the statutory and regulatory requirements for welding procedures or other units requiring the exercise of the skills and knowledge covered by this unit. Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Statutory and safety requirements	Statutory and safety requirements as required by AS 1796 welding codes
Welding	Welding to AS 1796 using any of the following processes: • flux core arc welding • gas metal arc welding • gas tungsten arc welding • manual metal arc welding

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Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Fabrication

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MEM05036C Repair/replace/modify fabrications

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers assessing task requirements; preparing materials; undertaking the repair, replacement or modification of the fabrication; cleaning and finishing to specifications; and inspecting the result.

Application of the Unit

Application of the unit	This unit requires an integrated level of skills in fabrication maintenance and repair. This unit is intended to build on skills covered by the specialist prerequisites. Processes may involve the simple mark out of materials, and the setting up and operation of a variety of welding and cutting plant/equipment. If individual skills are required, relevant specialist units only should be selected. Where additional or more complex marking out skills are required, refer to Unit MEM12007D (Mark off/out structural fabrications and shapes). If machines and equipment for forming, bending or shaping are required, Unit MEM05010C (Apply fabrication, forming and shaping techniques) should also be selected. **Band**: **A** **Unit Weight**: **4**

Licensing/Regulatory Information

Not Applicable

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Pre-Requisites

Prerequisite units		
Path 1	MEM05005B	Carry out mechanical cutting
	MEM05007C	Perform manual heating and thermal cutting
	MEM05011D	Assemble fabricated components
	MEM05012C	Perform routine manual metal arc welding
	MEM05015D	Weld using manual metal arc welding process
	MEM05051A	Select welding processes
	MEM05052A	Apply safe welding practices
	MEM09002B	Interpret technical drawing
	MEM12023A	Perform engineering measurements
	MEM18001C	Use hand tools
	MEM18002B	Use power tools/hand held operations
Path 2	MEM05005B	Carry out mechanical cutting
	MEM05007C	Perform manual heating and thermal cutting
	MEM05011D	Assemble fabricated components
	MEM05017D	Weld using gas metal arc welding process
	MEM05050B	Perform routine gas metal arc welding
	MEM05051A	Select welding processes
	MEM05052A	Apply safe welding practices
	MEM09002B	Interpret technical drawing

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Prerequisite units		
	MEM12023A	Perform engineering measurements
	MEM18001C	Use hand tools
	MEM18002B	Use power tools/hand held operations
Path 3	MEM05004C	Perform routine oxy acetylene welding
	MEM05005B	Carry out mechanical cutting
	MEM05007C	Perform manual heating and thermal cutting
	MEM05011D	Assemble fabricated components
	MEM05022C	Perform advanced welding using oxy acetylene welding process
	MEM05051A	Select welding processes
	MEM05052A	Apply safe welding practices
	MEM09002B	Interpret technical drawing
	MEM12023A	Perform engineering measurements
	MEM18001C	Use hand tools
	MEM18002B	Use power tools/hand held operations
Path 4	MEM05005B	Carry out mechanical cutting
	MEM05007C	Perform manual heating and thermal cutting
	MEM05011D	Assemble fabricated components
	MEM05019D	Weld using gas tungsten arc welding process
	MEM05049B	Perform routine gas tungsten arc welding
	MEM05051A	Select welding processes

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Prerequisite units		
	MEM05052A	Apply safe welding practices
	MEM09002B	Interpret technical drawing
	MEM12023A	Perform engineering measurements
	MEM18001C	Use hand tools
	MEM18002B	Use power tools/hand held operations

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Assess and process repair, replacement, modification requirement	1.1. Work requirements are determined from job sheet, instruction or visual inspection. 1.2. Specifications and drawings are obtained and interpreted where required. 1.3. Fabrication is inspected and suitability for repair/replacement/modification determined.
2. Assess and process	2.1. Material requirements are assessed in accordance

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ELEMENT	PERFORMANCE CRITERIA
material requirements	with relevant codes, manufacturers' specifications and standard operating procedures. 2.2. Materials are obtained/requisitioned according to standard operating procedures. 2.3. Tool and equipment requirements are assessed and obtained, where required, according to standard operating procedures.
3. Prepare materials	3.1. Fabrication for repair/replacement and/or modification is prepared to specification using acceptable workplace practices, tools and equipment. 3.2. Materials are marked out and prepared to specifications with minimum wastage using correct principles, tools, equipment and procedures. 3.3. Materials are cut, bent, rolled, shaped or formed to specifications using appropriate fabrication techniques/procedures, tools and equipment. 3.4. Where required, items are marked for identification.
4. Repair, replace or modify fabrication	4.1. Using suitable clamping methods, equipment, jigs and fixtures, materials are positioned/clamped for welding. 4.2. Pre-tack checks are undertaken and compliance with specifications is determined prior to tack welding in position. 4.3. Welding equipment is prepared and settings are adjusted according to requirements. 4.4. Immediate work site environment is checked to ensure compliance with safety requirements and procedures. 4.5. Material or item is tack welded using appropriate distortion minimisation techniques and procedures. 4.6. Material or item is checked against specifications prior to welding. 4.7. Material or item is welded to specifications using techniques and procedures appropriate to job requirements.
5. Finish and inspect repair, replacements and/or modification	5.1. Repair, replacement and/or modification is cleaned and finished to specifications using appropriate workplace practices. 5.2. Welds are visually inspected to assess weld quality against predetermined specifications. 5.3. Completed repair, replacement and/or modification is assessed against specifications.

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ELEMENT	PERFORMANCE CRITERIA
	5.4. Maintenance report is prepared and lodged according to standard operating procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in: • visually inspecting fabrication for defects, faults, and compliance • marking out • minimising wastage of materials • cutting, bending, rolling, shaping or forming materials • positioning and clamping materials for welding • undertaking pre-welding/tacking checks • setting up and adjusting welding equipment • tack welding • welding according to all relevant codes, and specifications • cleaning and finishing materials/fabrication • reading and interpreting job sheets, specifications, drawings, standard operating procedures, manufacturer documentation and other literature to the level required by this unit • assessing material and equipment requirements • using measuring skills for preparing and marking out materials and for checking modification against specifications • completing short reports using relevant terminology and format
Required knowledge
Look for evidence that confirms knowledge of: • applicable industry standards, national/Australian standards, NOHSC guidelines, State/Territory regulatory codes of practice/standards • characteristics of faults, defects and or non-compliance • means of rectifying faults, defects and/or non-compliance by rework or additional work, or by replacement of components/materials • effects of proposed modifications on the fabrication • reasons for selection of specific materials, tools, equipment and consumables

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REQUIRED SKILLS AND KNOWLEDGE
• marking out principles, techniques • material preparation processes • clamping method(s) for the welds undertaken. • location of all materials to be welded • weld specifications • equipment, consumables and settings required to achieve the weld specification • distortion minimisation procedures and methods for rectifying any distortion of materials • material cleaning and finishing processes for the repair/replacement/modification • reporting requirements • use and application of personal protective equipment • safe work practices and procedures • hazards and hazard control measures associated with repairing, replacing or modifying fabrications

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to integrate skills in fabrication maintenance and repair/replace/modify fabrications. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this

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EVIDENCE GUIDE	
	unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with repairing, replacing or modifying fabrications, or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Fabrication inspected	Determine defects/faults, non-compliance with specifications, repair/replacement/modification
Marked out	Marking out principles, techniques

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RANGE STATEMENT	
Marked for identification	To undergo repair, replacement and/or modification, to be cut, bent, rolled, shaped or formed to specifications
Clamping methods	Automatic, semi-automatic, manual methods
Welding equipment	MMAW, GMAW, GTAW

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Fabrication

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MEM05042B Perform welds to code standards using flux core arc welding process

Modification History

Editorial correction to unit application to include missing notes relating to dual band status.

Single band identifier removed to clarify dual status.

Unit Descriptor

Unit descriptor	This unit covers preparing and producing welds to code standards using flux core arc welding (FCAW).

Application of the Unit

Application of the unit	This unit applies to the production of butt and fillet welds in all positions. Welds in this unit are associated with high quality fabrications. Welds produced to the standard of this unit would typically conform to Australian Standard 1210, AS 4140, American Society of Mechanical Engineers (ASME) IX or equivalent. This unit, in conjunction with Unit MEM05026C (Apply welding principles), may satisfy the requirements of AS 1796 Certificate 8F. **Band**: This unit has dual status and is to be regarded as both a Specialisation band A unit and Specialisation band B unit for progression to C7 (AQF level IV). **Unit Weight**: **6**

Licensing/Regulatory Information

Not Applicable

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Pre-Requisites

Prerequisite units		
Path 1	MEM05007C	Perform manual heating and thermal cutting
	MEM05026C	Apply welding principles
	MEM05047B	Weld using flux core arc welding process
	MEM05048B	Perform advanced welding using flux core arc welding process
	MEM05050B	Perform routine gas metal arc welding
	MEM05051A	Select welding processes
	MEM05052A	Apply safe welding practices
	MEM09002B	Interpret technical drawing
	MEM12023A	Perform engineering measurements
	MEM18001C	Use hand tools
	MEM18002B	Use power tools/hand held operations

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range

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	statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Maintain welding equipment	1.1. Routine maintenance is performed on welding equipment.
2. Prepare welding materials and equipment for FCAW welding to code standard	2.1. Weld requirements for FCAW welding to code standards are determined. 2.2. Materials are prepared to produce weld to code standard. 2.3. Welding equipment is set up correctly.
3. Weld joints using FCAW to procedure specifications	3.1. Materials are welded as per weld procedure specification.
4. Ensure weld quality	4.1. Discontinuities are rectified to ensure conformance to code requirements. 4.2. Weld records are maintained in accordance with standard operating procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in: • depositing welds to procedure requirements • determining weld outcomes, consumables and settings from welding procedure specification • interpreting technical drawings and weld specifications for welding to code standards using FCAW • using hand and power tools to prepare and weld materials to code standard • using measurement and numeracy skills for welding to code standards • reading and interpreting routine information on written job instructions,

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REQUIRED SKILLS AND KNOWLEDGE
specifications and standard operating procedures. May include drawings
Required knowledge
Look for evidence that confirms knowledge of: • requirements to produce welds to quality of AS1210, AS4140, ASME IX or equivalent • safe welding practices • use and application of personal protective equipment for FCAW • relevant standards or codes • methods for preparing plate and pipe for code standard welding • pre-welding and post-welding heating methods and requirements for plate and pipe welding to code standard • requirements for maintaining weld records to code standard • hazards and control measures associated with welding, including housekeeping

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to prepare and produce welds to code standards using FCAW process. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this

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EVIDENCE GUIDE	
	unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with performing welds to code standards using flux core arc welding process, or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Routine maintenance	Ensuring gun, cable, contact tip etc. are in good condition
Prepared	Flame cut and ground or machined; preheating, setting up of jigs, fixtures, clamps, etc.

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RANGE STATEMENT	
Materials	Carbon/manganese steel, low alloy steel etc. on plate, pipe and rolled steel sections

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Fabrication

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MEM05043B Perform welds to code standards using gas metal arc welding process

Modification History

Editorial correction to unit application to include missing notes relating to dual band status.

Single band identifier removed to clarify dual status.

Unit Descriptor

Unit descriptor	This unit covers preparing and producing welds to code standards using gas metal arc welding (GMAW).

Application of the Unit

Application of the unit	This unit applies to performing GMAW to code standard carried out using a range of materials. Welds in this unit are associated with high quality fabrications. Butt and fillet welds in the flat, horizontal, vertical and overhead positions would be applied to meet Australian Standards 1210, AS 4140, ASME IX or equivalent. This unit, in conjunction with Unit MEM05026C (Apply welding principles), may satisfy the requirements of AS 1796 Certificate 8G. **Band**: This unit has dual status and is to be regarded as both a Specialisation Band A unit and Specialisation Band B unit for progression to C7 (AQF level IV). **Unit Weight**: **6**

Licensing/Regulatory Information

Not Applicable

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Pre-Requisites

Prerequisite units		
Path 1	MEM05007C	Perform manual heating and thermal cutting
	MEM05017D	Weld using gas metal arc welding process
	MEM05018C	Perform advanced welding using gas metal arc welding process
	MEM05026C	Apply welding principles
	MEM05050B	Perform routine gas metal arc welding
	MEM05051A	Select welding processes
	MEM05052A	Apply safe welding practices
	MEM09002B	Interpret technical drawing
	MEM12023A	Perform engineering measurements
	MEM18001C	Use hand tools
	MEM18002B	Use power tools/hand held operations

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range

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	statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Maintain welding equipment	1.1. Routine maintenance is performed on welding equipment.
2. Prepare welding materials and equipment for GMAW welding to code standard	2.1. Weld requirements for GMAW welding to code standards are determined. 2.2. Materials are prepared to produce weld to code standard. 2.3. Welding equipment is set up correctly.
3. Weld joints using GMAW to procedure specifications	3.1. Materials are welded as per weld procedure specification.
4. Ensure weld quality	4.1. Discontinuities are rectified to ensure conformance to code requirements. 4.2. Weld records are maintained in accordance with standard operating procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in: • depositing welds to procedure requirements • determining weld outcomes, consumables and settings from welding procedure specification • interpreting technical drawings and weld specifications for welding to code standards using GMAW • using hand and power tools to prepare and weld materials to code standard • using measurement and numeracy skills for welding to code standards • using language and literacy skills to enable completion of weld records

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REQUIRED SKILLS AND KNOWLEDGE
Required knowledge
Look for evidence that confirms knowledge of: • requirements to produce welds to quality of AS 1210, AS 4140, ASME IX or equivalent • safe welding practices • use and application of personal protective equipment for GMAW • relevant standards or codes • methods for preparing plate and pipe for code standard welding • pre-welding and post-welding heating methods and requirements for plate and pipe welding to code standard • requirements for maintaining weld records to code standard • hazard and control measures associated with welding, including housekeeping

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to prepare and produce welds to code standards using GMAW process. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment

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EVIDENCE GUIDE	
	should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with performing welds to code standards using gas metal arc welding process or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Routine maintenance	Ensuring gun, liner, contact tip etc. are in serviceable condition
Prepared	Flame cut and ground or machined; preheating, setting up of jigs, fixtures, clamps, etc.
Materials	Carbon/manganese steel, low alloy steel and

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RANGE STATEMENT	
	aluminium materials, etc. on plate, pipe and rolled steel sections

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Fabrication

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MEM05044B Perform welds to code standards using gas tungsten arc welding process

Modification History

Editorial correction to unit application to include missing notes relating to dual band status.

Single band identifier removed to clarify dual status.

Unit Descriptor

Unit descriptor	This unit covers preparing and producing welds to code standards using gas tungsten arc welding (GTAW).

Application of the Unit

Application of the unit	This unit applies to welds associated with high quality fabrications, using a range of materials. Butt and fillet welds in the flat, horizontal, vertical and overhead positions would be applied to meet Australian Standards 1210, AS 4140, ASME IX or equivalent. The unit, together with Unit MEM05026C (Apply welding principles), may satisfy the requirements of AS 1796 Certificate 7. Where advanced manual thermal cutting, gouging and shaping is carried out, Unit MEM05008C (Perform advanced manual thermal cutting, gouging and shaping) should also be selected. **Band**: This unit has dual status and is to be regarded as both a Specialisation band A unit and Specialisation band B unit for progression to C7 (AQF level IV). **Unit Weight**: **6**

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Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		
Path 1	MEM05007C	Perform manual heating and thermal cutting
	MEM05019D	Weld using gas tungsten arc welding process
	MEM05020C	Perform advanced welding using gas tungsten arc welding process
	MEM05026C	Apply welding principles
	MEM05049B	Perform routine gas tungsten arc welding
	MEM05051A	Select welding processes
	MEM05052A	Apply safe welding practices
	MEM09002B	Interpret technical drawing
	MEM12023A	Perform engineering measurements
	MEM18001C	Use hand tools
	MEM18002B	Use power tools/hand held operations

Employability Skills Information

Employability skills	This unit contains employability skills.

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Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Maintain welding equipment	1.1. Routine maintenance is performed on welding equipment.
2. Prepare welding materials and equipment for GTAW welding to code standard	2.1. Weld requirements for GTAW welding to code standards are determined. 2.2. Materials are prepared to produce weld to code standard. 2.3. Welding equipment is set up correctly.
3. Weld joints using GTAW to procedure specifications	3.1. Materials are welded as per weld procedure specification.
4. Ensure weld quality	4.1. Discontinuities are rectified to ensure conformance to code requirements. 4.2. Weld records are maintained in accordance with standard operating procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in: • depositing welds to procedure requirements • determining weld outcomes, consumables and settings from welding procedure specification

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REQUIRED SKILLS AND KNOWLEDGE
• interpreting technical drawings and weld specifications for welding to code standards using GTAW • using hand and power tools to prepare and weld materials to code standard • using measurement and numeracy skills for welding to code standards • reading and interpreting routine information on written job instructions, specifications and standard operating procedures. May include drawings • following oral instructions
Required knowledge
Look for evidence that confirms knowledge of: • requirements to produce welds to quality of AS 1210, AS 4140, ASME IX or equivalent • safe welding practices • use and application of personal protective equipment for GTAW • relevant standards or codes • methods for preparing plate and pipe for code standard welding • pre-welding and post-welding heating methods and requirements for plate and pipe welding to code standard • requirements for maintaining weld records to code standard • hazards and control measures associated with welding, including housekeeping

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to prepare and produce welds to code standards using GTAW process. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.

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EVIDENCE GUIDE	
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with performing welds to code standards using gas tungsten arc welding process (GTAW) or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and

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RANGE STATEMENT	
regional contexts) may also be included.	
Routine maintenance	Ensuring hand piece, gas shroud, flow meter etc. are in serviceable condition
Prepared	Flame cut and ground or machined, preheating, setting up of jigs, fixtures, clamps, etc.
Materials	Carbon/manganese steel, low alloy steel and aluminium materials, etc. on plate, pipe and rolled steel sections

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	

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MEM05045B Perform pipe welds to code standards using manual metal arc welding process

Modification History

Editorial correction to unit application to include missing notes relating to dual band status.

Single band identifier removed to clarify dual status.

Unit Descriptor

Unit descriptor	This unit covers preparing and producing pipe welds to code standards using manual metal arc welding (MMAW).

Application of the Unit

Application of the unit	This unit applies to MMAW to code standard carried out using a range of materials. Welds in this unit are associated with high quality fabrications. Butt welds in pipe with the axis horizontal, vertical and/or askew would be applied to meet Australian Standards 1210, AS 4140, ASME IX or equivalent. The unit, together with Unit MEM05026C (Apply welding principles), may satisfy the requirements of AS 1796 Certificates 2 and 4. Where advanced manual thermal cutting, gouging and shaping is carried out, Unit MEM05008C (Perform advanced manual thermal cutting, gouging and shaping) should also be selected. **Band**: This unit has dual status and is to be regarded as both a Specialisation band A unit and Specialisation band B unit for progression to C7 (AQF level IV). **Unit Weight**: **6**

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Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		
Path 1	MEM05007C	Perform manual heating and thermal cutting
	MEM05012C	Perform routine manual metal arc welding
	MEM05015D	Weld using manual metal arc welding process
	MEM05016C	Perform advanced welding using manual metal arc welding process
	MEM05026C	Apply welding principles
	MEM05051A	Select welding processes
	MEM05052A	Apply safe welding practices
	MEM09002B	Interpret technical drawing
	MEM12023A	Perform engineering measurements
	MEM18001C	Use hand tools
	MEM18002B	Use power tools/hand held operations

Employability Skills Information

Employability skills	This unit contains employability skills.

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Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Maintain welding equipment	1.1. Routine maintenance is performed on welding equipment.
2. Prepare welding materials and equipment for MMAW pipe welding to code standards	2.1. Weld requirements for MMAW welding to code standards are determined. 2.2. Welding equipment is set up correctly. 2.3. Materials are prepared to produce pipe weld to code standard.
3. Weld pipe using MMAW to procedure specifications	3.1. Materials are welded as per weld procedure specification.
4. Ensure weld quality	4.1. Discontinuities are rectified to ensure conformance to code requirements. 4.2. Weld records are maintained in accordance with standard operating procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in: • depositing welds to procedure requirements.

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REQUIRED SKILLS AND KNOWLEDGE
• determining weld outcomes, consumables and settings from welding procedure specification • interpreting technical drawings and weld specifications for welding to code standards using MMAW • using hand and power tools to prepare and weld materials to code standard • using measurement and numeracy skills for welding to code standards • using language and literacy skills to enable completion of weld records
Required knowledge
Look for evidence that confirms knowledge of: • requirements to produce welds to quality of AS 1210, AS 4140, ASME IX or equivalent • safe welding practices • use and application of personal protective equipment for MMAW • knowledge of appropriate standards or codes • methods for preparing pipe for code standard welding • pre-welding and post-welding heating methods and requirements for pipe welding to code standard • requirements for maintaining weld records to code standard • hazards and control measures associated with welding, including housekeeping

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to perform pipe welds to code standards using MMAW process. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.

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EVIDENCE GUIDE	
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both. Where assessment occurs off the job, i.e. the candidate is not in productive work, appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with the preparation and production of welds or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and

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RANGE STATEMENT	
regional contexts) may also be included.	
Routine maintenance	Ensuring leads, hand pieces etc. are in serviceable condition, and correct current carrying capacity
Prepare welding materials	Preheating, setting up of jigs, fixtures, clamps, etc.
Prepared	Flame cut and ground or machined
Materials	Carbon/manganese steel, stainless steel and low alloy steel materials, etc.

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Fabrication

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MEM05046B Perform welds to code standards using manual metal arc welding process

Modification History

Correction to unit application to include missing notes relating to dual band status.

Single band identifier removed to clarify dual status.

Unit Descriptor

Unit descriptor	This unit covers preparing and producing welds to code standards using manual metal arc welding (MMAW).

Application of the Unit

Application of the unit	This unit applies to MMAW to code standard carried out using a range of materials. Welds in this unit are associated with high quality fabrications. Butt and fillet welds in the flat, horizontal, vertical and overhead positions would be applied to meet Australian Standards 1210, AS 4140, ASME IX or equivalent. This unit, together with Unit MEM05026C (Apply welding principles), may satisfy the requirements of AS 1796 Certificates 1, 1E, 3 and 3E. Where advanced manual thermal cutting, gouging and shaping is carried out, Unit MEM05008C (Perform advanced manual thermal cutting, gouging and shaping) should also be selected. **Band**: This unit has dual status and is to be regarded as both a Specialisation band A unit and Specialisation band B unit for progression to C7 (AQF level IV). **Unit Weight**: **6**

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Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		
Path 1	MEM05007C	Perform manual heating and thermal cutting
	MEM05012C	Perform routine manual metal arc welding
	MEM05015D	Weld using manual metal arc welding process
	MEM05016C	Perform advanced welding using manual metal arc welding process
	MEM05026C	Apply welding principles
	MEM05051A	Select welding processes
	MEM05052A	Apply safe welding practices
	MEM09002B	Interpret technical drawing
	MEM12023A	Perform engineering measurements
	MEM18001C	Use hand tools
	MEM18002B	Use power tools/hand held operations

Employability Skills Information

Employability skills	This unit contains employability skills.

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Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Maintain welding equipment	1.1. Routine maintenance is performed on welding equipment.
2. Prepare welding materials and equipment for MMAW welding to code standard	2.1. Weld requirements for MMAW welding to code standards are determined. 2.2. Materials are prepared to produce weld to code standard. 2.3. Welding equipment is set up correctly.
3. Weld joints using MMAW to procedure specifications	3.1. Materials are welded as per weld procedure specification.
4. Ensure weld quality	4.1. Discontinuities are rectified to ensure conformance to code requirements. 4.2. Weld records are maintained in accordance with standard operating procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in: • depositing welds to procedure requirements • determining weld outcomes, consumables and settings from welding procedure

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REQUIRED SKILLS AND KNOWLEDGE
specification • interpreting technical drawings and weld specifications for welding to code standards using MMAW • using hand and power tools to prepare and weld materials to code standard • using measurement and numeracy skills for welding to code standards • using language and literacy skills to enable completion of weld records
Required knowledge
Look for evidence that confirms knowledge of: • requirements to produce welds to quality of AS 1210, AS 4140, ASME IX or equivalent • safe welding practices • use and application of personal protective equipment for MMAW • knowledge of appropriate standards or codes • methods for preparing plate for code standard welding • pre-welding and post-welding heating methods and requirements for plate welding to code standard • requirements for maintaining weld records to code standard • hazards and control measures associated with welding, including housekeeping

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to perform welds to code standards using MMAW process. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for	This unit may be assessed on the job, off the job or a

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EVIDENCE GUIDE	
assessment	combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with the preparation and production of welds or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

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RANGE STATEMENT	
Routine maintenance	Ensuring leads, hand pieces etc. are in serviceable condition, and correct current carrying capacity
Prepare welding materials	Preheating, setting up of jigs, fixtures, clamps, etc.
Prepared	Flame cut and ground or machined
Materials	Carbon/manganese steel, stainless steel and low alloy steel materials, etc.

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Fabrication

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MEM05047B Weld using flux core arc welding process

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers preparing materials, selecting and setting up the welding equipment, carrying out flux core arc welding (FCAW) and inspecting for and correcting defects.

Application of the Unit

Application of the unit	Welds are associated with heavy or light fabrication. Fillet and butt welds in all positions would typically be performed on a range of materials that may include carbon steel or stainless steel etc. Welding procedures and the skills are applied to a range of fabrication activities. As a guide, welds produced to the standard of this unit would typically conform to Australian Standard 1554 General Purpose, American Bureau of Shipping (ABS) or equivalent. Where thermal processes, hand and/or power tools are required, the appropriate specialisation units should be accessed. **Band**: **A** **Unit Weight**: **4**

Licensing/Regulatory Information

Not Applicable

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Pre-Requisites

Prerequisite units		
Path 1	MEM05050B	Perform routine gas metal arc welding
	MEM05051A	Select welding processes
	MEM05052A	Apply safe welding practices
	MEM12023A	Perform engineering measurements
	MEM18001C	Use hand tools
	MEM18002B	Use power tools/hand held operations

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Prepare materials for flux core arc welding	1.1. Weld requirements are identified from specifications and/or drawings. 1.2. Materials are correctly prepared.

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ELEMENT	PERFORMANCE CRITERIA
	1.3. Materials are assembled/aligned to specification where required.
2. Select welding machine components	2.1. Welding machine settings accessories and consumables are identified.
3. Assemble and set up welding equipment	3.1. Welding equipment is assembled and set up.
4. Minimise and rectify distortion	4.1. Appropriate distortion prevention measures are selected. 4.2. Distortion is rectified.
5. Weld to job specification using FCAW	5.1. Weld deposit is to specification. 5.2. Joints are cleaned to specifications.
6. Ensure weld conformance	6.1. Defects are removed with minimum loss of sound metal using correct and appropriate techniques and tools. 6.2. Weld joints are visually inspected for conformance to specifications.
7. Maintain weld records	7.1. Weld records are completed correctly.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in: • identifying and interpreting appropriate standard e.g. Australian Standard 1554 General Purpose, American Bureau of Shipping (ABS) or equivalent • depositing welds in accordance with appropriate standards • following specifications and drawings • using appropriate tools and techniques to prepare material for welding • undertaking distortion prevention and rectification • cleaning the welded joint using appropriate tools and techniques • removing weld defects to achieve a minimum amount of sound metal with the defect.

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REQUIRED SKILLS AND KNOWLEDGE
• reading and interpreting information on written job instructions, specifications, standard operating procedures and drawings • recording routine information related to FCAW onto proformas and standard workplace forms • following oral instructions • using measurement skills relating to joint preparation and FCAW
Required knowledge
Look for evidence that confirms knowledge of: • types of gases and their uses • the relationships between amperage/wire feed, voltage, gas flow, electrode, contact tip and material • material preparation • polarity • electrode stickout • joint preparations • electrode classification • causes of distortion for materials within the scope of this unit • safe welding practices • use and application of personal protective equipment for FCAW • hazards and control measures associated with welding, including housekeeping

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to prepare materials, select and set up the welding equipment, carry out FCAW welding and inspect for and correcting defects. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency

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EVIDENCE GUIDE	
	in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with welding using flux core arc welding process (FCAW) or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work

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RANGE STATEMENT	
situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Materials	Carbon steel or stainless steel
Prepared	Preheating, setting up of jigs, fixtures, clamps, etc.
Consumables	Gas or gasless wire, a range of gases
Equipment	Semi-automatic machines
Distortion prevention	Measures include preheating, setting up of jigs, fixtures, clamps, etc.
Rectified	Using oxy acetylene air arc equipment and grinding devices

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Fabrication

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MEM05048B Perform advanced welding using flux core arc welding process

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers preparing materials, selecting and setting up the welding equipment, carrying out advanced flux core arc welding (FCAW), inspecting for and correcting defects, and maintaining the weld records.

Application of the Unit

Application of the unit	Work is carried out on a range of structural sections and/or plate and/or pipe for general fabrication and may include low carbon steel, stainless steel, low alloy steel, etc. As a guide, welds produced to the standard of this unit would typically conform to Australian Standard 1554 Structural Purpose, Bureau Det Norse Verticas or equivalent. **Band**: **A** **Unit Weight**: **4**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		
Path 1	MEM05007C	Perform manual heating and

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Prerequisite units		
		thermal cutting
	MEM05047B	Weld using flux core arc welding process
	MEM05050B	Perform routine gas metal arc welding
	MEM05051A	Select welding processes
	MEM05052A	Apply safe welding practices
	MEM09002B	Interpret technical drawing
	MEM12023A	Perform engineering measurements
	MEM18001C	Use hand tools
	MEM18002B	Use power tools/hand held operations

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Prepare welding materials and equipment	1.1. Welding equipment is prepared. 1.2. Appropriate welding equipment is assembled and adjusted correctly and safely. 1.3. Materials are prepared to achieve required weld specification.
2. Weld joints to code requirements using advanced FCAW	2.1. Weld requirements are interpreted correctly. 2.2. Welds are deposited correctly to specifications.
3. Assess weld quality and rectify faults	3.1. Weld joints are visually inspected against specifications. 3.2. Defects are removed using appropriate methods for the given task. 3.3. Weld records are correctly completed and maintained.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Look for evidence that confirms skills in:

- depositing fillet and butt welds correctly
- performing all weld and preparation requirements
- identifying discontinuities that do not meet standard requirements
- repairing discontinuities
- using preheat methods
- interpreting weld requirements and specifications
- entering information onto proformas and standard workplace forms
- interpreting technical drawings and weld specifications relating to advanced FCAW
- using hand and power tools to prepare and weld material using FCAW
- using measurement and numeracy skills relating to advanced FCAW and preparation
- selecting equipment and consumables appropriate to task

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REQUIRED SKILLS AND KNOWLEDGE
• using visual identification of faults/defects
Required knowledge
Look for evidence that confirms knowledge of: • in depth knowledge of the properties and characteristics of a wide range of materials • requirements to conform to Australian Standard AS 1554 Structural Propose, Bureau Det Norse Verticas or equivalent • weld procedures and requirements • safe welding practices • use and application of personal protective equipment for FCAW • purpose of pre-welding and/or post-welding heating and the methods of application • instructions, symbols, specifications including bead size, bead placement, reinforcement, weld procedure sheet • discontinuities in relation to standards/requirements • different welder identification systems such as numbering, bar coding, paint coding, letter stamps

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to carry out advanced FCAW, inspect for and correct defects, and maintain the weld records. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where

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EVIDENCE GUIDE	
	assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with performing advanced welding using flux core arc welding process or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Welding equipment	Gases, settings, electrodes and related equipment

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RANGE STATEMENT	
	selected in accordance with welding procedure
Prepared	Preheating, setting up of jigs, fixtures, clamps, etc.
Materials	Low carbon, cast iron, stainless and low alloy steel
Welds	Fillet and butt in horizontal, vertical and overhead positions
Appropriate methods	Oxy acetylene and air act equipment, grinding devices

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Fabrication

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MEM05049B Perform routine gas tungsten arc welding

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers preparing the materials and carrying out routine gas tungsten arc welding (GTAW).

Application of the Unit

Application of the unit	This unit applies in a maintenance or manufacturing environment where the weld quality is not required to meet an Australian Standard. Fillet and butt welds would typically be performed on low carbon/mild steels and aluminium. Where welding is required to meet Australian Standard 1554 General Purpose or equivalent codes, occupational health and safety regulations and/or licensing requirements, Unit MEM05019D (Weld using gas tungsten arc welding process) should be selected. **Band**: **A** **Unit Weight**: **2**

Licensing/Regulatory Information

Refer to Application of the Unit

Pre-Requisites

Prerequisite units		

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Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Identify weld requirements	1.1. Weld requirements are identified from job instructions. 1.2. The locations of welds are identified in accordance with standard operating procedures and job specifications.
2. Prepare materials for welding	2.1. Materials are cleaned and prepared ready for welding.
3. Prepare equipment for welding	3.1. Welding equipment is set up correctly. 3.2. Settings and consumables are selected to suit application.
4. Perform routine welding using GTAW	4.1. Safe welding practices are applied. 4.2. Materials are welded to job requirements. 4.3. Welds are cleaned to standard operating procedures.

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in: • preparing materials • setting up welding equipment • welding with GTAW • reading and interpreting routine information on written job instructions, specifications and standard operating procedures • using measurement skills for joint preparation and routine GTAW
Required knowledge
Look for evidence that confirms knowledge of: • preparatory requirements • properties and characteristics of materials and consumables • equipment and equipment settings • fuel gas properties and applications • post welding treatments • weld characteristics • safe welding practices • use and application of personal protective equipment for routine GTAW

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to perform routine gas tungsten arc welding (GTAW).

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EVIDENCE GUIDE	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with carrying out routine gas tungsten arc welding or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT

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RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Materials	Mild and low carbon steel
Prepared	Preheating, setting up jigs, fixtures, clamps, joint preparation
Equipment	Hoses, welding leads and gas shrouds, electrodes, gas regulator, liners, contact tips
Consumables	Tungsten electrodes, filler wire, shielding gas
Cleaned	Slag, spatter

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Fabrication

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MEM05050B Perform routine gas metal arc welding

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers preparing materials and routine gas metal arc welding (GMAW).

Application of the Unit

Application of the unit	This unit applies in a maintenance or manufacturing environment where the weld quality is not required to meet an Australian Standard or equivalent. Fillet and butt welds would typically be performed on low carbon/mild steels. Where welding is required to meet Australian Standard 1554 General Purpose or equivalent codes, occupational health and safety regulations and/or licensing requirements, Unit MEM05017D (Weld using gas metal arc welding process) should be selected. **Band**: **A** **Unit Weight**: **2**

Licensing/Regulatory Information

Refer to Application of the Unit

Pre-Requisites

Prerequisite units		

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Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Identify weld requirements	1.1. Weld requirements are identified from job instructions. 1.2. Locations of welds are identified in according to standard operating procedures and job specifications.
2. Prepare materials for welding	2.1. Materials are cleaned and prepared ready for welding.
3. Prepare equipment for welding	3.1. Welding equipment is set up correctly. 3.2. Settings and consumables are selected to suit application.
4. Perform routine welding using GMAW	4.1. Safe welding practices are applied. 4.2. Materials are welded to job requirements. 4.3. Welds are cleaned to standard operating procedures.

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in: • preparing materials • setting up welding equipment • welding with GMAW • reading and interpreting routine information on written job instructions, specifications and standard operating procedures • following oral instruction • using measurement skills relating to joint preparation and routine GMAW
Required knowledge
Look for evidence that confirms knowledge of: • different current and voltage settings, gas flow rates wire diameters, wire feed speed and other variables to suit typical situations. • material and equipment preparation • properties and characteristics of materials and consumables • equipment and equipment settings • fuel gas properties and applications • post-welding treatments • weld characteristics • safe welding practices • use and application of personal protective equipment for routine GMAW

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must

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EVIDENCE GUIDE	
	be able to perform routine gas metal arc welding (GMAW).
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with preparing the materials and carrying out routine gas metal arc welding or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

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Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Materials	Mild and low carbon steel
Prepared	Preheating, setting up jigs, fixtures, clamps, joint preparation
Equipment	Hoses, welding leads, gas shrouds, gas regulators, liners, contact tips
Consumables	Filler wire, shielding gas
Cleaned	Slag and spatter

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

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Competency field

Competency field	Fabrication

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MEM05051A Select welding processes

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers identifying material properties and selecting appropriate welding processes to achieve safe and effective welding outcomes.

Application of the Unit

Application of the unit	This unit applies to all types of welding. It includes the identification of properties and characteristics of all commonly used metals, and selection of appropriate welding techniques to ensure integrity of materials is maintained during welding processes. **Band**: **A** **Unit Weight**: **2**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		

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Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Identify properties of commonly used metals	1.1. Materials to be welded are identified. 1.2. Characteristics and properties of commonly used materials are identified. 1.3. Uses and purposes of commonly used materials are identified. 1.4. Basic metallurgical characteristics are considered.
2. Identify and provide for welding contingencies	2.1. Information relevant to welding processes is sourced as required. 2.2. Potential contingencies are identified and solutions are considered.
3. Identify appropriate welding processes	3.1. Welding processes are identified and selected to achieve specified outcomes with selected metals. 3.2. Effects of welding processes on materials are identified. 3.3. Distortion prevention measures are identified. 3.4. Alternative joining methods for job are identified and assessed for relevancy.
4. Identify cleaning and preparation requirements	4.1. Processes for cleaning and preparing metals are identified. 4.2. Role of contaminants in welding flaws is explained. 4.3. Safety requirements for chemicals and other

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ELEMENT	PERFORMANCE CRITERIA
	materials are identified and utilised in accordance with manufacturers' specifications and legislative requirements.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in: • reading, interpreting and following information on written job instructions, specifications, standard operating procedures, charts, lists, drawings and other applicable reference documents • planning and sequencing operations • checking and clarifying task-related information
Required knowledge
Look for evidence that confirms knowledge of: • hazards and control measures associated with welding practices, including housekeeping • safe work practices and procedures • properties and characteristics of commonly used metals and materials • basic metallurgy principles • information resources • chemical content of fumes emitted by welding processes • uses and purposes of various metals • distortion prevention measures for various metals

Evidence Guide

EVIDENCE GUIDE
The evidence guide provides advice on assessment and must be read in conjunction with the

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EVIDENCE GUIDE	
performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to select welding processes.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with selecting welding processes or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

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Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Characteristics	Tensile strength, grade, heat resistance, density
Properties	Physical properties, flammable limits, melting point
Basic metallurgical characteristics	Alloys and grades of metals and different types of electrodes
Information	Steel suppliers handbooks, welding company materials, standard operating procedures, safety documentation

Welding processes	• Fusion:
	  • electric arc welding
	  • gas (oxy-fuel) welding
	  • thermit welding
	• Pressure welding processes:
	  • resistance welding
	  • fire or forge welding
	  • friction welding
	  • explosive welding
	• Low temperature processes:
	  • soldering
	  • brazing
	• Other:
	  • ultrasonic welding
	  • electron beam welding

Effects	Thermal expansion, heat affected zones, fume emissions, altered density, distortion
Distortion prevention measures	Heat treatments, consolidations
Processes for cleaning and weld preparation	Etching, grinding, arc gouging, thermal cutting, chemical additives, anti-corrosion treatments

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RANGE STATEMENT	
Safety requirements	• Dry and ventilated areas • In accordance with workplace procedures • Location away from heat risks • Location away from incompatible substances • Requirements for hazardous substances • Adequate signage and labelling • Appropriate sealing • Routine inspections • Emergency procedures • Regulatory notification requirements

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Fabrication

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MEM05052A Apply safe welding practices

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers identifying risks associated with welding operations and implementing hazard reduction practices.

Application of the Unit

Application of the unit	This unit applies to gas and electric arc welding. It includes the identification of risks associated with welding all commonly used metals and implementation of techniques used to reduce or eliminate welding hazards. **Band**: **A** **Unit Weight**: **4**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		

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Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Access and interpret OH&S information	1.1. OH&S information is obtained and interpreted. 1.2. Relevant OH&S legislation is identified. 1.3. Work related safety information is obtained and interpreted.
2. Identify risks associated with welding	2.1. Pollutants formed by welding processes are identified. 2.2. Occupational diseases and injuries which may be associated with welding are identified. 2.3. Factors associated with increased risk are identified. 2.4. Exposure levels for pollutants are identified. 2.5. Risks and potential health effects associated with specific metals are identified. 2.6. Risks and potential health effects associated with gases in welding are identified. 2.7. Other hazards of welding are identified.
3. Reduce risks associated with welding	3.1. Manual handling techniques are used. 3.2. Personal protective equipment is used correctly. 3.3. Procedures to control hazards are implemented. 3.4. Workplace safety procedures are implemented. 3.5. Workplace safety non-compliances are reported in accordance with workplace procedures.

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in: • sourcing and interpreting safety-related information and Material Safety Data Sheets (MSDS) • planning and sequencing operations • identifying workplace risks and nonconformances • reporting workplace risks and nonconformances • checking and clarifying task-related information
Required knowledge
Look for evidence that confirms knowledge of: • characteristics and properties of common metals and welding materials • effect of gas and electrical welding operations on metals • hazards and control measures associated with gas and electrical welding, including housekeeping • welding safety practices and procedures • effect of various treatments on a range of commonly used metals • use and application of personal protective equipment

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to apply safe welding practices.
Critical aspects for assessment and	Assessors must be satisfied that the candidate can

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EVIDENCE GUIDE	
evidence required to demonstrate competency in this unit	competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with applying safe welding practices or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT
The range statement relates to the unit of competency as a whole. It allows for different

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RANGE STATEMENT	
work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
OH&S information	• National Occupational Health and Safety Commission guidelines • Organisational OH&S practices and procedures manuals • Australian/New Zealand and ISO standards • Company risk management policy • Codes of practice • Australian dangerous goods legislation • Trade practices • Occupational Health and Safety reporting requirements • Weld procedures
Work related safety information	• Standard operating procedures • Material safety data sheets (MSDSs) • Job sheets • Emergency procedures • Safety standards and procedures
Pollutants	• Nitrogen oxides • Ozone • Metal fumes etc. • Lead oxide • Silicon oxide • Calcium fluoride • Calcium oxide • Magnesium oxide • Sodium oxide • Potassium oxides • Carbon dioxide • Organics • Iron • Manganese • Calcium carbonate • Zirconium oxide • Titanium oxide • Hexavalent chromium

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RANGE STATEMENT	
Occupational diseases and injuries	• Eye injuries • Skin damage • Respiratory irritations • Chronic effects • Allergies
Factors	• Gas leakage from cylinders • Type of consumable and metals used • Type of welding processes • Type of electrodes • Welding current • Voltage and amperage • Ventilation • Contamination • Interaction of chemicals • Exposure levels • Flammability
Exposure levels	• Time Weighted Average • Short Term Exposure Limit (STEL) • Maximum Allowable Concentration (MAC) or Threshold Limit Value - Ceiling (TLV-C) • Skin Notation
Specific metals	• Aluminium • Antimony • Arsenic • Beryllium • Boron • Cadmium • Chromium • Copper • Cobalt • Iron • Lead • Lithium • Magnesium • Manganese • Mercury • Molybdenum • Nickel • Platinum • Selenium

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RANGE STATEMENT	
	• Silver • Thorium • Tin • Titanium • Tungsten • Vanadium • Zinc • Zirconium
Gases	• Acetylene • Argon • Carbon dioxide • Carbon monoxide • Helium • Nitrogen oxides • Ozone • Phosgene • Phosphine • Stibine
Other hazards	• Fluxes • Electro-magnetic radiation • Electric shock • Sparks • Spatter • Contaminated and coated metals • Gas cylinder and electrical hazards • Confined spaces • Noise • Chemical exposure • Solvents • Musculoskeletal, back and overuse injuries • Vibration • Dusts • Heat stress • Ultraviolet radiation • Airborne pollutants • Flammable gases • Infrared radiation • Thermal damage
Manual handling techniques	• Housekeeping practices • Lifting weight limits

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RANGE STATEMENT	
	• Appropriate storage • Use of lifting devices • Appropriate training • Hazardous materials storage standards and procedures
Personal protective equipment	• Respirators • Ear muffs • Protective clothing • Gloves • Boots • Helmets • Eye protection • Face shields
Procedures to control hazards	• Substituting hazardous materials with safer materials • Changing workplace design to eliminate hazards • Modifying work practices to reduce exposure • Using personal protective equipment • Using adequate and appropriate ventilation
Workplace safety measures	• Shielding requirements • Ventilation • General and diluted • Local exhaustion • Use of personal protective equipment • Checking equipment condition • Equipment maintenance • Correct operation of equipment • Correct voltage and electrical connections • Good posture • Fire safety, plant and equipment isolation • Communications with appropriate personnel

Unit Sector(s)

Unit sector	

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Co-requisite units

Co-requisite units		

Competency field

Competency field	Fabrication

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MEM07005C Perform general machining

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit of competency covers determining the job requirements and sequence of operations, selecting and mounting tools, performing the machining, measuring the components, and adjusting and maintaining a range of standard machine tools.

Application of the Unit

Application of the unit	The unit of competency applies to the use of machinery to shape metal including lathes, mills, planers, shapers, radial arm drills, slotters and surface grinders. This unit has been developed to support Engineering Tradesperson - Mechanical apprenticeship training and the recognition of trade level skills in machining operations. Skills covered by this unit are generally applied in occupational and work situations associated with fitting and machining. It may also apply to other trade occupations requiring general machining skills. It may also apply in some circumstances to senior operators who have responsibility for machine set up, selection of materials and lubricants, establishment of datum points and basic marking out, and setting of speeds, feeds and other machining parameters. This unit has application in the MEM30205 Certificate III in Engineering - Mechanical qualification and other qualifications requiring a basic trade level of machining skills. It may also apply to MEM20205 Certificate II in Engineering - Production Technology and MEM30105 Certificate III in Engineering - Production Systems and other qualifications requiring machining skills. Machining is undertaken on one or more of a range of standard machine tools. Machines are not computer numerical controlled (CNC) machines.

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	Where machining is undertaken without undertaking any set up including mounting of tools, setting of speeds, feeds and other operational parameters then either MEM07024B Operate and monitor machine/process or MEM07025B Perform advanced machine/process operation should be selected. Drilling operations in this unit exclude those covered by MEM18002B Use power tools/hand held operations. Where substantial marking out is required, MEM12006C Mark off/out (general engineering) should be considered. Where precision measurement is required, MEM12003B Perform precision mechanical measurement should also be considered. For set-up and operation of electro-discharge (EDM) machines, refer to MEM07014B Perform electro-discharge (EDM) machining operations. **Band**: **A** **Unit Weight**: **8**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		
Path 1	MEM09002B	Interpret technical drawing
	MEM12023A	Perform engineering measurements
	MEM18001C	Use hand tools

Employability Skills Information

Employability skills	This unit contains employability skills.

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Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Determine job requirements	1.1. Drawings, instructions and specifications are interpreted and understood
2. Determine sequence of operations	2.1. Sequence of operations including job set-up is determined for maximum efficiency and to meet job specifications 2.2. Appropriate material is selected and datum established as required
3. Select and mount tools	3.1. Appropriate tools for job are selected, sharpened and shaped as required 3.2. Tools are mounted and positioned correctly
4. Perform machining operations	4.1. Basic marking out techniques are used where required 4.2. Machining parameters are set for job requirements and maximum tool life 4.3. Work is held or correctly clamped without damage to product, and all safety requirements are met 4.4. Machining is performed in a safe manner utilising all guards, safety procedures and personal protective clothing and equipment
5. Measure components	5.1. Components are checked with instruments or gauges appropriate to the measurement requirements to ensure compliance with specifications
6. Adjust and maintain machine	6.1. Routine maintenance and adjustments are carried out as required which may include slide and collar adjustment, cleaning and lubrication

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- reading and interpreting routine information on written job instructions, specifications and standard operating procedures which may include drawings
- following oral instruction
- planning and sequencing operations
- preparing operational work plan
- sharpening and shaping cutting tools
- identifying worn or damaged cutting tools
- correct mounting and positioning of cutting tools
- basic marking out of materials
- setting machining parameters to achieve the job requirements and maximise tool life
- using appropriate and sufficient clamping/mounting of the work piece
- using coolant/lubricant correctly
- checking for conformance to specifications
- measuring to specified tolerances and dimensions

Required knowledge

Required knowledge includes:

- reasons for selecting the chosen sequence of operations
- methods of work holding
- basic marking out techniques including datum points/lines
- geometry of cutting tools for a range of materials and applications
- benefits of using correctly sharpened cutting tools
- machine operation
- selection of feeds and speeds to suit a range of materials and operations within the scope of this unit
- correct methods of mounting a variety of cutting tools
- safety issues with regard to correct clamping, guards and shields
- tolerances and limits of size
- situations indicating the need for machine adjustment, lubrication and cleaning
- techniques, tools and equipment to measure materials and machined components

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REQUIRED SKILLS AND KNOWLEDGE
• use and application of personal protective equipment • safe work practices and procedures • hazards and control measures associated with general machining

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to perform general machining including responsibility for selecting and mounting tooling and setting machining parameters. Competency in this unit cannot be claimed until all prerequisites have been satisfied
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently apply the skills covered in this unit of competency in new and different situations and contexts. Critical aspects of assessment and evidence include: • correct job planning including identifying job requirements from drawings, instructions or specifications and sequence of operations • identifying any required tooling, measuring equipment and accessories • selecting and mounting required tooling • selecting material and marking out if required • setting machining parameters • checking machined components for conformance to specifications.
Context of and specific resources for assessment	This unit has been developed to support training in and recognition of trade level competency in general machining as applied to a trade level fitting and machining, other trade or senior operator work environment. Assessment should emphasise a workplace context and procedures found in the candidate's

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EVIDENCE GUIDE	
	workplace. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate.
Method of assessment	Typically Engineering Tradespersons - Mechanical and other persons engaged in general machining work are required to apply their machining skills and techniques across a range of jobs and specifications. A single assessment event is not appropriate. On the job assessment should be included as part of the assessment process wherever possible. Where assessment occurs off the job, judgement must consider evidence of the candidate's performance in a productive work environment that includes a sufficient range of appropriate tasks and materials to cover the scope of application for this unit. Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with performing general machining or other units requiring the exercise of the skills and knowledge covered by this unit. Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.

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Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Operations	Operations may include: • parallel cutting • slotting • planing • drilling • knurling • cutting flats • non-precision surface grinding operations
Materials	Materials may include ferrous and non-ferrous
Tools	Tools may include: • cutting tools and accessories • measuring devices
Marking out techniques	Marking out techniques may include basic marking out techniques using calipers, steel rules, dividers and scribers
Machining parameters	Machining parameters may include: • speeds • feeds • stops • coolant and cutting lubricants
Machines	Machines may include: • lathes • mills • planers • shapers • radial arm drills • slotters

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RANGE STATEMENT	
	• surface grinder
Maintenance and adjustments	Maintenance and adjustments may include: • slide and collar adjustment • cleaning and lubrication

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Machine and process operations

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MEM07006C Perform lathe operations

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit of competency covers performing machining operations on a lathe to produce components to required tolerances and specifications using all types of accessories except for the use of taper turning attachment and copy turning attachments. The unit does not cover turning of multi-start threads.

Application of the Unit

Application of the unit	This unit of competency applies to the production of components using centre lathes and lathe accessories, precision measuring equipment and cutting tools on a range of standard engineering materials. It does not include use of a taper turning attachment, copy turning attachment or multi-start threads. Work is performed to established processes, practices and specifications. Cutting tools are selected using International Standard Organisation (ISO) standards or according to standard operating procedure as appropriate. Work is performed to drawings, sketches, specifications and instructions as appropriate. This unit has been developed for Engineering Tradesperson - Mechanical apprenticeship training and the recognition of trade level skills in lathe operations. Skills covered by this unit are generally applied in occupational and work situations associated with trade level fitting and machining work. This unit has application in the MEM30205 Certificate III in Engineering - Mechanical qualification and other qualifications requiring a trade level of lathe operation skills. Lathe operations may also be known as turning and the processes and associated level of skill covered by this unit are often described in industry by the term '1st Class

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	Machining'. **Band**: **A** **Unit Weight**: **4**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		
Path 1	MEM07005C	Perform general machining
	MEM09002B	Interpret technical drawing
	MEM12023A	Perform engineering measurements
	MEM18001C	Use hand tools

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Observe safety precautions	1.1. Correct safety procedures are observed and protective clothing and safety glasses worn
2. Determine job requirements	2.1. Drawings are interpreted, sequence of operation is determined and tooling is selected to produce component to specification
3. Mount job	3.1. Job is set up using instruments such as dial test indicators, and digital read-out equipment
4. Perform turning operations	4.1. Speeds and feeds are calculated using appropriate mathematical techniques and reference material 4.2. The full range of accessories on a centre lathe are used including three and four jaw chucks, centres, face plate, steadies, cross slide and tailstock 4.3. Turning operations are performed to specification
5. Check components for conformance with specifications	5.1. Components are checked for conformance to specification using appropriate techniques, tools and equipment

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- interpreting technical drawings/specifications in relation to turning
- setting up jobs using appropriate equipment
- calculating and setting cutting feeds and speeds appropriate to the job
- checking that job is concentric and running true
- safely operating lathes
- performing turning operations

Required knowledge

Required knowledge includes:

- sequence of operations to achieve the job requirements

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REQUIRED SKILLS AND KNOWLEDGE
• tool type and geometry to achieve the required specifications and for work pieces of different materials • numerical operations, geometry and calculations/formulae within the scope of this unit • the consequences of varying speeds and feeds from the optimum rates calculated • characteristics of different materials and their effects on cutting speeds and feeds • application of lathe accessories • techniques, tools and equipment to measure materials and machined components • use and application of personal protective equipment • safe work practices and procedures • hazards and control measures associated with lathe operations

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to perform a variety of lathe operations to specifications. Competency in this unit cannot be claimed until all prerequisites have been satisfied
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently apply the skills covered in this unit of competency in new and different situations and contexts. Critical aspects of assessment and evidence include: • determining requirements for turning job including quantity, material, measurements and tolerances • correct job planning including identifying required measuring equipment, tooling, accessories and sequence of operations • correct preparation of high speed steel tooling • correct fixing of job and tooling • calculating and setting of required speeds and feeds • correct monitoring of turning operation • turning undertaken to trade standard in terms of time

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EVIDENCE GUIDE	
	and responsibility for own work • undertaking correct remedial procedures for out of specification results as per enterprise procedures e.g. procedures for scrapping or reworking of components not turned to specification.
Context of and specific resources for assessment	This unit has been developed to support training in and recognition of trade level competency in lathe operations as applied to a trade level fitting and machining work environment. Assessment should emphasise a workplace context and procedures found in the candidate's workplace. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate.
Method of assessment	Typically, persons engaged in Engineering Tradesperson - Mechanical work are required to apply their lathe operations skills and techniques across a range of jobs and specifications. A single assessment event is not appropriate. On the job assessment should be included as part of the assessment process wherever possible. Where assessment occurs off the job, judgement must consider evidence of the candidate's performance in a productive work environment that includes a sufficient range of appropriate tasks and materials to cover the scope of application for this unit. Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated

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EVIDENCE GUIDE	
	with lathe operations or other units requiring the exercise of the skills and knowledge covered by this unit. Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Drawings	Drawings include engineering drawings to AS 1100/1102
Tooling	Tooling includes: • high speed steel, tungsten carbide, ceramic graphite and other standard cutting tools • boring bars • drills • reamers • thread chasers • tapping heads • taps
Instruments	Instruments may include: • manual and digital micrometers • vernier calipers • dial indicators • scribing blocks
Speeds and feeds	Speeds and feeds may include: • setting up machine

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RANGE STATEMENT	
	• changing gears and speeds • use of lead screw • calculations
Accessories	Accessories may include: • three and four jaw chucks • centres • face plate • steadies • cross slide • tailstock
Turning operations	Turning operations may include: • manual parallel and taper turning • internal and external turning including boring drilling, reaming, single start thread cutting and parting off

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Machine and process operations

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MEM07007C Perform milling operations

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit of competency covers performing machining operations on a range of milling machines to produce components to required tolerances and specifications using all types of accessories.

Application of the Unit

Application of the unit	This unit of competency applies to a range of milling machines including vertical, horizontal and universal types, a range of precision measuring equipment and cutting tools. Work is performed to established processes, practices and to drawings, sketches, specifications and instructions as appropriate. Cutting tools are selected using International Standard Organisation (ISO) standards or according to standard operating procedure as appropriate. This unit has been developed for Engineering Tradesperson - Mechanical apprenticeship training and the recognition of trade level skills in milling operations. Skills covered by this unit are generally applied in occupational and work situations associated with trade level fitting and machining work. This unit has application in the MEM30205 Certificate III in Engineering - Mechanical qualification and other qualifications requiring a trade level of mill machine operation skills. Milling operations and the processes and associated level of skill covered by this unit are often described in industry by the term '1st Class Machining'. **Band**: **A** **Unit Weight**: **4**

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Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		
Path 1	MEM07005C	Perform general machining
	MEM09002B	Interpret technical drawing
	MEM12023A	Perform engineering measurements
	MEM18001C	Use hand tools

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Observe safety	1.1. Correct safety procedures are observed and

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ELEMENT	PERFORMANCE CRITERIA
precautions	protective clothing and safety glasses worn
2. Determine job requirements	2.1. Drawings are interpreted, sequence of operation is determined and tooling is selected to produce component to specification 2.2. Cutting parameters are determined
3. Perform milling operations	3.1. Milling operations are carried out to produce components to specification 3.2. Operations are undertaken using conventional and/or climb milling techniques and a variety of cutters including slab, gang, end, shell, slot, form, slitting 3.3. The full range of standard accessories is used including dividing heads and rotary tables as required
4. Check components for conformance with specifications	4.1. Components are checked for conformance to specification using appropriate techniques, tools, instruments and equipment

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Required skills include: • setting up jobs using appropriate equipment • calculating and setting cutting feeds and speeds appropriate to the job • interpreting drawings and job instructions/specifications • milling components to specification • visually and dimensionally checking components for conformance to specification
Required knowledge
Required knowledge includes: • safety hazards associated with milling machines • sequence of operations to achieve the job requirements • cutter types and tooling geometry • consequences of varying speeds and feeds from the optimum rates calculated

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REQUIRED SKILLS AND KNOWLEDGE
• effects of different materials on cutting speeds and feeds • conventional and climb milling techniques and their applications • the application of each of the following: slab, gang, shell, slot, form and slitting • applications requiring the use of dividing heads and rotary tables when milling components • the procedures for using dividing heads and rotary tables on milling machines • appropriate techniques, tools and equipment to measure milled components • use and application of personal protective equipment • safe work practices and procedures

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to perform a variety of milling operations to specifications. Competency in this unit cannot be claimed until all prerequisites have been satisfied
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently apply the skills covered in this unit of competency in new and different situations and contexts. Critical aspects of assessment and evidence include: • determining requirements for milling job including quantity, material, measurements and tolerances • correct job planning including identifying required measuring instruments and equipment, tooling, accessories and sequence of operations • correct fixing of job and tooling • calculation and setting of required speed and feed • correct monitoring of milling operation • milling undertaken to trade standard in terms of time and responsibility for own work • undertaking correct remedial procedures for out of specification results as per enterprise procedures e.g.

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EVIDENCE GUIDE	
	procedures for scrapping or reworking of components not milled to specification.
Context of and specific resources for assessment	This unit has been developed to support training in and recognition of trade level competency in milling operations as applied to a trade level fitting and machining work environment. Assessment should emphasise a workplace context and procedures found in the candidate's workplace. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate.
Method of assessment	Typically, persons engaged in Engineering Tradesperson - Mechanical work are required to apply their milling operations skills and techniques across a range of jobs and specifications. A single assessment event is not appropriate. On the job assessment should be included as part of the assessment process wherever possible. Where assessment occurs off the job, judgement must consider evidence of the candidate's performance in a productive work environment that includes a sufficient range of appropriate tasks and materials to cover the scope of application for this unit. Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with milling operations or other units requiring the exercise of the skills and knowledge covered by this unit.

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EVIDENCE GUIDE	
	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Drawings	Drawings include engineering drawings to AS 1100/1102
Tooling	Tooling includes: • slab • gang • end • shell • slot • form • slitting cutters
Instruments	Instruments may include: • manual and digital micrometers • vernier calipers • dial indicators • scribing blocks
Cutting parameters	Cutting parameters may include setting up machine, feed and speed calculations
Accessories	Accessories may include dividing heads and rotary tables

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Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Machine and process operations

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MEM07008D Perform grinding operations

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit of competency covers determining the job requirements, observing safety precautions, selecting appropriate wheels and accessories, performing the grinding operations and checking the components for conformance to specifications.

Application of the Unit

Application of the unit	This unit of competency applies to grinding operations performed on surface, cylindrical and centreless grinding machines. It requires use of measuring equipment and standard engineering materials and tooling. Work is performed to established processes, practices and to drawings, sketches, specifications and instructions as appropriate. This unit has been developed for Engineering Tradesperson - Mechanical apprenticeship training and the recognition of trade level skills in grinding operations. Skills covered by this unit are generally applied in occupational and work situations associated with trade level fitting and machining work. This unit has application in the MEM30205 Certificate III in Engineering - Mechanical qualification and other qualifications requiring a trade level of grinding machine operation skills. Grinding operations and the processes and associated level of skill covered by this unit are often described in industry by the term '1st Class Machining'. Where precision mechanical measurement is required, MEM12003B Perform precision mechanical measurement should also be considered.

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	Band: **A** **Unit Weight**: **4**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		
Path 1	MEM07005C	Perform general machining
	MEM09002B	Interpret technical drawing
	MEM12023A	Perform engineering measurements
	MEM18001C	Use hand tools

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Determine job requirements	1.1. Job requirements are determined from specifications, and sequence of operations is determined 1.2. Correct and appropriate holding devices are selected and applied
2. Observe safety precautions	2.1. Machine guards, coolant and dust extraction devices are checked 2.2. Correct safety procedures are observed and protective clothing and safety glasses are worn
3. Select grinding wheels and accessories	3.1. Wheels are selected, balanced and dressed based on knowledge of grinding wheel structure and application 3.2. Accessories are selected to facilitate production to job specifications
4. Perform grinding operations	4.1. Grinding machine is set up and adjusted in accordance with defined procedures 4.2. Work piece is held or clamped appropriately to avoid damage 4.3. Grinding operations are performed safely, utilising all guards, safety procedures and personal protective clothing and equipment
5. Check components for conformance with specifications	5.1. Components are checked for conformance to specification using appropriate techniques, tools and equipment

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- reading and interpreting information on written job instructions, procedures, specifications, charts, lists, drawings and other applicable reference documents
- checking and clarifying task related information
- preparing an operational work plan

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REQUIRED SKILLS AND KNOWLEDGE
• planning and sequencing operations • using precision measurement equipment within the scope of this unit • setting up work using tools, techniques and equipment • using coolant and dust extraction devices • selecting and preparing grinding wheels and accessories appropriate to the grinding task • performing and monitoring internal/external cylindrical grinding process • clamping/mounting work pieces • checking for conformance to specifications • performing numerical operations and calculations within the scope of this unit
Required knowledge
Required knowledge includes: • reasons for selecting the chosen sequence of operations • the application of a range of holding devices/accessories • reasons for selecting specific work holding devices, tools, techniques and equipment • coolant selection/function • standard grinding wheel shapes • the range of abrasive materials used in grinding wheels • factors impacting grinding wheel selection including grain size of abrasive particles, grade or strength of bond and bond material • grinding wheel dressing tools and their application • internal/external cylindrical grinding process • principles of effective clamping • grinding operations/procedures • the function of any grinding accessories • tools, techniques and equipment for checking components for conformance to specifications • hazards and control measures associated with grinding operations, including housekeeping • use and application of personal protective equipment • safe work practices and procedures

Evidence Guide

EVIDENCE GUIDE

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EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to perform a variety of grinding operations to specifications. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently apply the skills covered in this unit of competency in new and different situations and contexts. Critical aspects of assessment and evidence include: • determining requirements for grinding job including quantity, material, measurements and tolerances • correct job planning including identifying required measuring instruments and equipment, safety equipment, holding devices, grinding wheels, accessories and sequence of operations • identifying guard, coolant and dust extraction requirements and checking equipment and coolant before grinding operation • correct fixing of job • correct monitoring of grinding operation • undertaking grinding to trade standard in terms of time and responsibility for own work • undertaking correct remedial procedures for out of specification results as per enterprise procedures e.g. procedures for scrapping or reworking of components not ground to specification.
Context of and specific resources for assessment	This unit has been developed to support training in and recognition of trade level competency in grinding operations as applied to a trade level fitting and machining work environment. Assessment should emphasise a workplace context and procedures found in the candidate's workplace. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate.
Method of assessment	Typically, persons engaged in Engineering Tradesperson - Mechanical work are required to apply their grinding

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EVIDENCE GUIDE	
	operations skills and techniques across a range of jobs and specifications. A single assessment event is not appropriate. On the job assessment should be included as part of the assessment process wherever possible. Where assessment occurs off the job, judgement must consider evidence of the candidate's performance in a productive work environment that includes a sufficient range of appropriate tasks and materials to cover the scope of application for this unit. Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with grinding operations or other units requiring the exercise of the skills and knowledge covered by this unit. Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.

Range Statement

RANGE STATEMENT
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating

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RANGE STATEMENT	
conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Specifications	Specifications may include: • dimensions and tolerances • geometry and tolerances • surface finish
Holding devices	Holding devices may include: • vices • clamps • magnetic chucks • face plates • collets • 3/4 jaw chuck
Wheels	Wheels may include: • shape • grit/bond composition
Balanced	Balanced may include static and dynamic balancing
Grinding machines	Grinding machines may include surface, cylindrical and centreless machines

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

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Co-requisite units		

Competency field

Competency field	Machine and process operations

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MEM07011B Perform complex milling operations

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers performing complex milling operations, including gear cutting and helical milling of a range of materials.

Application of the Unit

Application of the unit	This unit applies to a range of complex milling operations including those jobs requiring high precision or quality across a range of materials including non-standard metals and alloys. It also includes those operations requiring complex calculations. **Band**: **A** **Unit Weight**: **4**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		
Path 1	MEM07005C	Perform general machining
	MEM07007C	Perform milling operations
	MEM09002B	Interpret technical drawing

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Prerequisite units		
	MEM12003B	Perform precision mechanical measurement
	MEM12023A	Perform engineering measurements
	MEM12024A	Perform computations
	MEM18001C	Use hand tools

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Select milling cutters	1.1. Correct milling cutter/s are selected for required operation. 1.2. Correct cutter inserts are selected as required using International Standard Organisation standards and mounted in cutter blank. 1.3. Cutter is mounted to machine spindle and checked for concentricity.
2. Set up work	2.1. Cutting parameters and steps required to mill given component/s are identified.

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ELEMENT	PERFORMANCE CRITERIA
	2.2. Machine is set up with appropriate accessories as required for milling operation. 2.3. Work is set up to required level of accuracy.
3. Perform complex milling	3.1. Components are milled and associated calculations are performed as necessary to achieve specification. 3.2. Components are verified using appropriate precision measuring equipment and reworked as necessary to meet specification.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Look for evidence that confirms skills in:

- reading, interpreting and following information on written job instructions, specifications, standard operating procedures, charts, lists, drawings and other applicable reference documents
- planning and sequencing operations
- checking and clarifying work related information
- setting up work to the required level of accuracy
- determining cutting parameters
- selecting the correct milling cutter inserts for the cutting parameters in accordance with ISO standards
- calculating cutting parameters such as speeds, feeds and ratios
- setting up gear trains according to calculations and standard operating procedures
- safely operating milling machine
- performing complex milling operations using dividing heads and omniversal tables

Required knowledge

Look for evidence that confirms knowledge of:

- precision measuring equipment and their applications
- procedures for accurately setting up work
- ISO standards applicable to milling cutter inserts
- procedures for milling components such as racks and gears
- calculations, geometry and formulae relating complex milling activities

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REQUIRED SKILLS AND KNOWLEDGE
• accessories used for complex milling • the applications and use of omniversal tables and differential dividing heads to complex milling operations • hazards and control measures associated with complex milling operations, including housekeeping • safe work practices and procedures

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to perform complex milling operations. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with performing complex milling operations or other units requiring the exercise of the skills and knowledge covered by this unit.

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EVIDENCE GUIDE	
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Complex milling operations	Cutting of spur gears, racks, helical gears, radial uniform rise cam lobes etc.
Milling cutter/cutters	Ganged cutters, form cutters etc.
Set up	Set up is verified using instruments such as dial test indicators and sine bars etc.
Appropriate accessories	Omniversal tables, differential dividing heads etc.

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Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Machine and process operations

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MEM07012B Perform complex grinding operations

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers performing complex grinding operations.

Application of the Unit

Application of the unit	This unit applies to high precision operations such as jig grinding, grinding eccentrics, thread grinding, gauges, shapes and forms etc. Work includes the use of a range of precision measuring instruments. Grinding operations are performed on a variety of materials to achieve high levels of precision for dimensions and finish. **Band**: **A** **Unit Weight**: **4**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		
Path 1	MEM07005C	Perform general machining
	MEM07008D	Perform grinding operations
	MEM09002B	Interpret technical drawing
	MEM12003B	Perform precision mechanical

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Prerequisite units		
		measurement
	MEM12023A	Perform engineering measurements
	MEM18001C	Use hand tools

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Determine job requirements	1.1. Job requirements are determined from specifications, and sequence of operations is determined.
2. Set up work	2.1. Grinding wheels are selected and dressed to form and size as required. 2.2. Work is set up to required level of accuracy as per specifications.
3. Perform complex grinding	3.1. Specialised grinding operations are performed on components such as jigs, tools and dies, eccentrics, threads, gauge shapes and forms.
4. Check components for conformance to	4.1. Components are checked for conformance to specification using appropriate techniques, tools and

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ELEMENT	PERFORMANCE CRITERIA
specification	equipment.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in: • preparing an operational work plan • dressing grinding wheel to form and size • performing specialised grinding operations • reading, interpreting and following information on written job instructions, specifications, charts, lists, drawings and other applicable reference documents • planning and sequencing operations • checking and clarifying information • entering routine and familiar information onto proformas and standard workplace forms • checking for conformance to specifications • using precision measurement equipment within the scope of this unit • measuring components to specified tolerances • performing numerical operations, geometry and calculations/formulae for specialised complex grinding operations
Required knowledge
Look for evidence that confirms knowledge of: • reasons for selecting the chosen sequence of operations • function and application of work holding devices/accessories appropriate to complex grinding • appropriate techniques, tools and equipment to measure machined components • hazards and control measures associated with complex grinding, including housekeeping • use and application of personal protective equipment • safe work practices and procedures

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Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to perform complex grinding operations. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with complex grinding operations or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.

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EVIDENCE GUIDE	
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Grinding wheels	Wheel selection criteria includes shape and grit/bond composition

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

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Competency field

Competency field	Machine and process operations

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MEM07021B Perform complex lathe operations

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers setting up work, selecting and preparing tooling and performing complex turning operations.

Application of the Unit

Application of the unit	This unit applies to complex, difficult or non-standard turning e.g. single-start and multi-start thread cutting, internal blind hole thread cutting, eccentrics, copy and taper turning, counterbalancing work on face plates, mandrel work, trepanning, heavy (multi-tonne) shafts etc. requiring high precision or quality using a range of materials including non-standard metals and alloys. Work would be performed autonomously using predetermined standards of quality and safety. **Band**: **A** **Unit Weight**: **4**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		
Path 1	MEM07005C	Perform general machining

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Prerequisite units		
	MEM07006C	Perform lathe operations
	MEM09002B	Interpret technical drawing
	MEM12003B	Perform precision mechanical measurement
	MEM12023A	Perform engineering measurements
	MEM12024A	Perform computations
	MEM18001C	Use hand tools

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Determine sequence of operations	1.1. Sequence of operations including job set-up is determined for maximum efficiency and to meet job specifications.
2. Set up work on lathe	2.1. Work is set up on the lathe to required level of accuracy using precision instruments such as dial test

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ELEMENT	PERFORMANCE CRITERIA
	indicators etc. 2.2. Work piece is balanced as required when using face plates to ensure accuracy in machining. 2.3. Work piece is set up to ensure that work piece is free of distortion following completion of machining.
3. Select and prepare tooling	3.1. Tooling, accessories and consumables are selected appropriate to task, specifications and material. 3.2. Where necessary, cutting tool modifications required to perform complex turning operations are determined. 3.3. Tooling and accessories are prepared and modified as required. 3.4. International Standard Organisation standards for cutting tools or other appropriate standards to suit cutting parameters are applied as necessary.
4. Perform complex turning	4.1. Speeds and feeds are correctly calculated using appropriate mathematical techniques and reference material. 4.2. Complex turning is undertaken to specifications and workplace procedures. 4.3. Work piece is measured and verified to be in accordance with specification using precision measuring equipment.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in: • setting up work to the required level of accuracy using appropriate precision measuring equipment • setting and supporting work to avoid distortion on release of clamping devices • selecting correct cutting tools or inserts as appropriate to turning operation • selecting and using appropriate feeds and speeds • performing complex turning operations - counter balancing work on face plates:

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REQUIRED SKILLS AND KNOWLEDGE

- mandrel work
- trepanning
- heavy (multi-tonne) shafts
- calculating cutting parameters, speeds and feeds
- reading, interpreting and following information on written job instructions, specifications, charts, lists, drawings and other applicable reference documents
- planning and sequencing operations
- checking and clarifying task related information
- entering routine and familiar information onto proformas and standard workplace forms
- checking for conformance to specifications
- using precision measurement equipment
- measuring components to specified tolerances
- performing numerical operations, geometry and calculations/formulae within the scope of this unit
- following oral instructions
- orally reporting information

Required knowledge

Look for evidence that confirms knowledge of:

- precision measuring equipment and measuring techniques within the scope of this unit
- reasons for selecting different measuring equipment
- procedures for accurately setting up work for a variety of techniques
- ISO or other standards applicable to cutting tool inserts
- cutting parameters for the given task
- feeds and speeds for complex turning operation(s)
- formulae and data relating to feeds and speeds
- techniques and procedures for carrying out the following turning operations:
  - single-start thread cutting
  - multi-start thread cutting
  - internal blind hole thread cutting
  - eccentrics
  - copy turning
  - taper turning
- techniques and procedures for carrying out the following turning operations:
  - counter balancing work on face plates
  - mandrel work
  - trepanning

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REQUIRED SKILLS AND KNOWLEDGE
• heavy (multi-tonne) shafts • hazards and control measures, including housekeeping • use and application of personal protective equipment • safe work practices and procedures

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to perform complex lathe operations. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with performing complex lathe operations or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be

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EVIDENCE GUIDE	
	gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Lathe	Applicable to all classes of lathes used for complex turning operations
Tooling	Cutting tools, form tools, boring bars, drills, reamers, thread chasers, tapping heads, taps etc.
Complex turning	May include single-start and multi-start thread cutting, internal blind hole thread cutting, eccentrics, copy and taper turning, counterbalancing work on face plates, mandrel work, trepanning, heavy (multi-tonne) shafts etc.

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Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Machine and process operations

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MEM09002B Interpret technical drawing

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers interpreting technical drawing applying to any of the full range of engineering disciplines.

Application of the Unit

Application of the unit	Technical drawings may utilise perspective, exploded views or hidden view techniques. Drawings are provided to Australian Standard 1100 and/or Australian Standard 1102 and their equivalents from the full range of engineering disciplines. Standard symbols to Australian Standard 1100 and/or Australian Standard 1102 or equivalent are recognised in field of employment. Technical drawings may include symbol glossaries. Where any drawing, sketch, chart, diagram is only used as the technique for communication, then this unit does not apply: see Unit MEM12023A (perform engineering measurements) or Unit MEM16006A (Organise and communicate information). **Band**: **A** **Unit Weight**: **4**

Licensing/Regulatory Information

Not Applicable

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Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Select correct technical drawing	1.1. Drawing is checked and validated against job requirements or equipment. 1.2. Drawing version is checked and validated.
2. Interpret technical drawing	2.1. Components, assemblies or objects are recognised as required. 2.2. Dimensions are identified as appropriate to field of employment. 2.3. Instructions are identified and followed as required. 2.4. Material requirements are identified as required. 2.5. Symbols are recognised in the drawing as appropriate.

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Look for evidence that confirms skills in:

- checking the drawing against job requirements/related equipment in accordance with standard operating procedures
- confirming the drawing version as being current in accordance with standard operating procedures
- where appropriate, obtaining the current version of the drawing in accordance with standard operating procedures
- reading, interpreting information on the drawing, written job instructions, specifications, standard operating procedures, charts, lists and other applicable reference documents
- checking and clarifying task related information
- undertaking numerical operations, geometry and calculations/formulae within the scope of this unit

Required knowledge

Look for evidence that confirms knowledge of:

- application of AS1100.101 in accordance with standard operating procedures
- relationship between the views contained in the drawing
- objects represented in the drawing
- units of measurement used in the preparation of the drawing
- dimensions of the key features of the objects depicted in the drawing
- understanding of the instructions contained in the drawing
- the actions to be undertaken in response to those instructions
- the materials from which the object(s) are made
- any symbols used in the drawing as described in range statement
- hazard and control measures associated with interpreting technical drawings, including housekeeping
- safe work practices and procedures

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Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to interpret technical drawings as described.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with interpreting technical drawings or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning should not require language, literacy and numeracy skills beyond those required in this unit. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

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Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Interpret technical drawing	AS1100.101 is an extensive work and the candidate is not required to have complete familiarity with all its contents, the application of AS1100 would usually be in line with standard operating procedures; interpretation may require guidance particularly in respect to any geometric tolerancing

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

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Competency field

Competency field	Drawing, drafting and design

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MEM09003B Prepare basic engineering drawing

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers identifying the drawing requirements, preparing or making changes to engineering drawings, preparing an engineering parts list and issuing the drawings

Application of the Unit

Application of the unit	The unit applies to the fields of mechanical, electrical/electronic, fabrication, and fluid power. Specifications may be obtained from design information, customer requirements, sketches and preliminary layouts. Manual drafting and drawing equipment is used, or where a Computer Aided Design (CAD) system is used other units should also be considered. This unit applies to any of the full range of engineering disciplines. Where a more extensive Computer Aided Drafting System is used for design, then Unit MEM09009C (Create 2D drawings using computer aided design system), should also be considered. **Band**: **A** **Unit Weight**: **8**

Licensing/Regulatory Information

Not Applicable

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Pre-Requisites

Prerequisite units		
Path 1	MEM09002B	Interpret technical drawing

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Identify drawing requirements	1.1. Requirements and purpose of drawing are determined from customer and/or work specification and associated documents. 1.2. All data necessary to produce the drawing is identified and collected. 1.3. Drawing requirements are confirmed with relevant personnel and timeframes for completion are established.
2. Prepare or make changes to engineering drawing	2.1. Drafting equipment is selected appropriate to the drawing method chosen. 2.2. Drafting principles are applied to produce a drawing that is consistent with standard operating procedures

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ELEMENT	PERFORMANCE CRITERIA
	within the enterprise. 2.3. All work is undertaken safely and to prescribed procedure. 2.4. Completed drawing is approved in accordance with standard operating procedures.
3. Prepare engineering parts list	3.1. Components parts are identified and organised by component type and/or in accordance with organisation/customer requirements.
4. Issue drawing	4.1. Drawings and or parts lists records are completed in accordance with standard operating procedures. 4.2. Approved drawings and or parts lists are copied and issued to relevant personnel in accordance with standard operating procedures. 4.3. Approved drawings and or parts lists are stored and catalogued in accordance with standard operating procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Look for evidence that confirms skills in:

- obtaining all relevant job requirements, data/information and specifications necessary to produce the drawing in accordance with workplace procedures
- using drafting equipment appropriate to the drawing method chosen
- producing/changing the drawing to conform with the relevant standard
- undertaking all work safely and in accordance with workplace procedures
- checking the completed drawing in accordance with standard operating procedures
- producing the component parts list with part name, description of part, material specification or part number, quantities and all other details specified by the customer and/or organisational procedures
- recording completed drawings and or parts lists in accordance with standard operating procedures
- where appropriate, copying and issuing approved drawings and or parts lists in accordance with standard operating procedures

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REQUIRED SKILLS AND KNOWLEDGE
• handling and storing the approved drawings and or parts lists in accordance with standard operating procedures • reading, interpreting and following information on written job instructions, specifications, standard operating procedures, charts, lists, drawings and other applicable reference documents • planning and sequencing operations • checking and clarifying task related information • undertaking numerical operations, geometry and calculations/formulae within the scope of this unit
Required knowledge
Look for evidence that confirms knowledge of: • requirements and purpose of the drawing to be produced • requirements and purpose of the engineering parts list • sources of relevant data/ information • timeframe for completion of the drawing(s) • person(s) who can confirm drawing requirements • method of drawing preparation • the reasons for selecting the chosen drawing method • procedures for producing an initial drawing • procedures for changing an existing drawing • drafting principles to be applied to the production/changing of a drawing • standards to which the drawing is to be produced • procedures for checking drawings • the persons responsible for checking and approving drawings • consequences of inappropriate/incomplete components parts lists • procedures and reasons for recording completed drawings and or parts lists • procedures for copying approved drawings and or parts lists • procedures for issuing approved drawings and or parts lists • the personnel to whom copies of approved drawings and or parts lists can be issued • procedures for filing approved drawings and or parts lists • procedures for safe handling and storage of drawings and or parts lists • consequences of inappropriate handling and storage of approved drawings and or parts lists • safe work practices and procedures

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Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to prepare basic engineering drawings. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with preparing basic engineering drawing or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.

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EVIDENCE GUIDE	
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Relevant personnel	Technical personnel, supervisors, manufacturers, suppliers, contractors, customers
Drafting equipment	Drafting and drawing equipment includes the use of Computer Aided Drafting systems
Drafting principles	Drawings are prepared in accordance with Australian Standard 1100.101, or equivalent, as required Interpretation of AS1100.101 or other problems are resolved in consultation with a supervisor
Records	Drawing records may include cataloguing, issuing security classifications, filing, preparing distribution lists
Issued	In hard copy, photographic, slide or transparency form including presentation as a single drawing and/or with other drawings, support documentation as a package

Unit Sector(s)

Unit sector	

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Co-requisite units

Co-requisite units		

Competency field

Competency field	Drawing, drafting and design

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MEM09004B Perform electrical/electronic detail drafting

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers producing electrical/electronic drawings under supervision.

Application of the Unit

Application of the unit	This unit applies to the production of drawings under supervision, in accordance with instructions and specifications to Australian Standard 1102 or equivalent using predetermined design specifications. This unit applies to all electrical/electronic areas. Manual drafting or drawing equipment is used or where a CAD system is used, Unit MEM09009C (Create 2D drawings using computer aided design system) and/or Unit MEM09010C (Create 3D models using computer aided design system) should also be considered. **Band**: **B** **Unit Weight**: **8**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units	

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Prerequisite units		
Path 1	MEM09002B	Interpret technical drawing
	MEM09003B	Prepare basic engineering drawing

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Prepare/make changes to electrical/electronic schematics and drawings	1.1. Schematic is drawn to indicate the relative positioning of electrical/electronic components. 1.2. Electrical/electronic drawings are produced to include all relevant specifications. 1.3. Schematic/drawing is completed to Australian Standard 1102 or equivalent.
2. Determine component and/or material requirement	2.1. Components and/or materials are selected from supplier/manufacturers' catalogues using design specifications.

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Look for evidence that confirms skills in:

- drawing electrical/electronic schematics correctly and indicating the relative position of the components
- producing electrical/electronic drawings with all relevant specifications
- producing electrical/electronic schematics/drawings in conformance with AS1102 or equivalent
- obtaining the circuit/component specifications
- reading, interpreting and following information on written job instructions, specifications, standard operating procedures, charts, lists, drawings and other applicable documents
- planning and sequencing operations
- checking and clarifying task related information
- undertaking numerical operations, geometry and calculations/formulae within the scope of this unit

Required knowledge

Look for evidence that confirms knowledge of:

- relative position of electrical/electronic components
- symbols used in electrical/electronic schematics and drawings
- specifications of all components
- circuit specifications
- requirements of AS1102 or equivalent with respect to electrical/electronic schematics/drawings
- design specifications of the circuit/components
- appropriate components and materials from supplier/manufacturers' catalogues
- reasons for selecting the chosen components and/or materials
- hazards and control measure associated with performing electrical/electronic detail drafting, including housekeeping
- safe work practices and procedures

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Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to perform electrical/electronic detail drafting. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with performing electrical/electronic detail drafting or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.

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EVIDENCE GUIDE	
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Drawings	Include plans, schematics, layouts, circuit diagrams and charts

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

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Competency field

Competency field	Drawing, drafting and design

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MEM09005B Perform basic engineering detail drafting

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers producing drawings to Australian Standard 1100 or equivalent where the critical dimensions and associated tolerances and design specifications are predetermined.

Application of the Unit

Application of the unit	Manual drafting or drawing equipment is used or where a CAD (Computer Aided Design) system is used, Unit MEM09009C (Create 2D drawings using computer aided design system) and/or Unit MEM09010C (Create 3D models using computer aided design system) should also be considered. **Band**: **A** **Unit Weight**: **8**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		
Path 1	MEM09002B	Interpret technical drawing
	MEM09003B	Prepare basic engineering drawing

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Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Prepare assembly, layout and detail drafting	1.1. Drawings are prepared in plane orthogonal, isometric projection or equivalent including auxiliary views and sections to Australian Standard 1100. 1.2. Layout, assembly and component drawings are prepared from specification. 1.3. Drawings are dimensioned and labelled using supplied tolerances in accordance with Australian Standard 1100. 1.4. Drawings are produced to specification in accordance with standard operating procedures. 1.5. Standard symbols to Australian Standard 1100 or equivalent are used to specify requirements.
2. Determine component and/or material requirement	2.1. Components and/or materials are selected from supplier/manufacturers' catalogues using design specifications.

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Look for evidence that confirms skills in:

- preparing drawings using appropriate projections and views in accordance with AS1100 or equivalent, see above note in the range statement
- producing layout, assembly and component drawings in conformance with specification
- inserting all relevant dimensions, tolerances and instructions in the drawing
- producing drawings to specification
- appropriately using standard symbols in accordance with AS1100 or equivalent in the drawings produced
- obtaining component specifications in accordance with work place procedures
- reading, interpreting and following information written job instructions, specifications, standard operating procedures, charts, lists, drawings and other applicable reference documents
- planning and sequencing operations
- checking and clarifying task related information
- checking for conformance to specifications
- undertaking numerical operations, geometry and calculations/formulae within the scope of this unit

Required knowledge

Look for evidence that confirms knowledge of:

- appropriate projection for the drawing purpose
- reasons for selecting the chosen projection
- reasons for including auxiliary views in drawings
- requirements of AS1100 or equivalent with respect to dimensions, tolerances and labels
- procedures for producing component, layout and/or assembly drawings
- drawing specifications
- common symbols used in drawings to AS1100 or equivalent
- design specifications of the component
- appropriate components and materials from supplier/manufacturers' catalogues
- reasons for selecting the chosen components and/or materials
- safe work practices and procedures

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Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to perform basic engineering detail drafting. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with basic engineering detail drafting or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes,

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EVIDENCE GUIDE	
	standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Australian Standard 1100	AS1100.100 is an extensive work and its application would usually be in line with standard operating procedures; interpretation would be under guidance particularly in respect to any geometric tolerancing

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

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Competency field

Competency field	Drawing, drafting and design

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MEM09006B Perform advanced engineering detail drafting

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers producing assembly, layout and detail drawings to Australian Standard 1100 or equivalent.

Application of the Unit

Application of the unit	Skills covered by this unit are applied individually or in a team environment where comprehensive responsibility for the production of the drawing is exercised, and critical dimensions and associated tolerances are determined where required. Manual drafting and drawing equipment is used or where a CAD (Computer Aided Design) system is used, Unit MEM09009C (Create 2D drawings using computer aided design system) and/or Unit MEM09010C (Create 3D models using computer aided design system) should also be considered. **Band**: **B** **Unit Weight**: **4**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units	

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Prerequisite units		
Path 1	MEM09002B	Interpret technical drawing
	MEM09003B	Prepare basic engineering drawing
	MEM09005B	Basic engineering detail drafting

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Prepare assembly, layout and detail drawing	1.1. Specification requirements are determined. 1.2. Engineering calculations are undertaken to determine all dimensions including limits and fits, surface texture, datum references and geometric tolerances where appropriate to ensure functional operation and suitability. 1.3. All drawings are produced to Australian Standard 1100 or equivalent.
2. Interpret specifications and select material, components and/or	2.1. Components, material and/or assemblies are selected from data sheets or manufacturers' catalogues to meet specifications.

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ELEMENT	PERFORMANCE CRITERIA
assemblies	
3. Check drawings	3.1. Drawings are checked to ensure compliance with specifications. 3.2. Drawings are checked to ensure that assembly/fabrication is possible.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Look for evidence that confirms skills in:

- obtaining all relevant work instructions and requirements
- producing all drawings in accordance with AS1100 or equivalent
- obtaining all relevant data sheets, catalogues, etc.
- checking drawings for conformance to specification
- checking drawings to ensure that assembly/fabrication is possible
- reading, interpreting and following information on written job instructions, specifications, standard operating procedures, charts, lists, drawings and other applicable reference documents
- planning and sequencing operations
- checking and clarifying task related information
- undertaking numerical operations, geometry and calculations/formulae within the scope of this unit

Required knowledge

Look for evidence that confirms knowledge of:

- specifications and/or requirements of the component, assembly or layout to be drawn
- functional operation of the component/assembly to be drawn
- surfaces which are to be in contact or separated
- appropriate type of fit for contacting surfaces
- reasons for selecting the chosen type of fit
- effect of surface finish on the performance/operation of surfaces
- appropriate datum points

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REQUIRED SKILLS AND KNOWLEDGE
• all appropriate lineal, diametric and geometric tolerances • procedures for determining tolerances • requirements of AS1100 or equivalent for the drawing(s) to be produced • specifications of the components, materials and/or assemblies • appropriate components and materials from supplier/manufacturers' catalogues • reasons for selecting the chosen components and/or materials • procedures for checking and approving drawings • reasons for checking the drawings to ensure that manufacturing/assembly is possible, efficient and cost effective • drawing specifications • methods of manufacture/assembly/fabrication from the drawing(s) • unnecessary or inappropriate tolerances • hazards and control measures associated with performing advanced engineering detail drafting, including housekeeping • safe work practices and procedures

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to perform advanced engineering detail drafting. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this

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EVIDENCE GUIDE	
	unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with performing advanced engineering detail drafting or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Australian Standard 1100 or equivalent	Complete familiarity with AS 1100.101 or similar and its application is required in the respective field

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Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Drawing, drafting and design

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MEM12003B Perform precision mechanical measurement

Modification History

Editorial correction to unit application to include missing notes relating to dual band status.

Single band identifier removed to clarify dual status.

Unit Descriptor

Unit descriptor	This unit covers performing precision mechanical measurement by using precision measuring equipment, setting comparison measuring devices and maintaining precision equipment.

Application of the Unit

Application of the unit	The unit applies to precision and/or complex use of strip gauges, engineering squares, lasers, angle dekkors, sine bars, angle gauges, polygons, dividing heads, rotary tables, precision levels, micrometers, height gauges, hardness testers, and texture measuring equipment etc. Work is undertaken autonomously or as part of team environment. Work is undertaken in the field (in situ) or in a workshop/laboratory environment. This unit covers comprehensive measuring skills where judgement is required in the selection of the most appropriate techniques/devices and where results are interpreted/analysed. All specifications are obtained from engineering drawings and data sheets and/or manufacturers' instructions/data. All measurement/test procedures are undertaken to standard operating procedures or manufacturers' recommended procedures. **Band**: This unit has dual status and is to be regarded as both a Specialisation Band A unit and Specialisation Band B unit for progression to C7 (AQF level IV)

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	Unit Weight: **2**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		
Path 1	MEM12023A	Perform engineering measurements

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Use precision measurement equipment	1.1. Appropriate precision equipment is selected to achieve specified outcome. 1.2. Correct and appropriate measuring techniques are

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ELEMENT	PERFORMANCE CRITERIA
	used for the measurement task. 1.3. Measurements are taken accurately to the finest graduation of instrument. 1.4. Readings and measurements are interpreted correctly and accurately.
2. Set comparative measuring devices	2.1. Measuring equipment is set to specifications using manufacturer guidelines or standard operating procedures and techniques.
3. Maintain precision equipment	3.1. Measuring equipment is adjusted and maintained to required accuracy, using manufacturer or standard operating procedures and techniques. 3.2. Equipment is stored to manufacturer specifications or standard operating procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in: • reading and interpreting text and numerical information on manufacturer specifications, standard operating procedures, charts, lists, drawings and other applicable reference documents • selecting/using precision mechanical measuring devices • setting measuring devices to specification • obtaining specified mechanical measurements to the finest graduation of the device • measuring components to specified tolerances • reading and interpreting measurements • maintaining and adjusting precision mechanical measuring devices • storing precision mechanical measuring devices • undertaking calculations and numerical operations for measurement using precision mechanical measuring equipment
Required knowledge
Look for evidence that confirms knowledge of: • the appropriate precision mechanical measuring device for given measurement

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REQUIRED SKILLS AND KNOWLEDGE
requirements • procedures to verify equipment being used has been recently calibrated • suitability of environmental conditions for the measurements being carried out • procedures/techniques for obtaining a range of mechanical measurements • the accuracy to which a range of precision mechanical measuring devices can be read • procedures for reading graduated mechanical measuring devices • units of measurement and numerical operations within the scope of this unit • procedures for setting precision mechanical measuring devices • specifications of the equipment to be set • tools and equipment for setting mechanical measuring devices • the adjustments that can be made to a range of precision mechanical measuring devices • procedures for adjusting and maintaining precision mechanical measuring devices • procedures for storing precision mechanical measuring devices • hazards and control measures associated with precision mechanical measurement, including housekeeping • safe work practices and procedures

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to perform precision mechanical measurement. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where

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EVIDENCE GUIDE	
	assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with other units addressing the safety, quality, communication, materials handling, recording and reporting associated with precision mechanical measurement or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning should not require language, literacy and numeracy skills beyond those required in this unit. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Equipment	Strip gauges, engineering squares, angle dekkors,

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RANGE STATEMENT	
	sine bars, angle gauges, polygons, dividing heads, rotary tables, precision levels, micrometers, height gauges, hardness testers, and texture measuring equipment
Appropriate measuring techniques	Includes considerations of the suitability of the environmental conditions for measurements being taken
Measurements	Length, circular, straightness, flatness, hardness, angles, finishes, textures, roundness, squareness, alignment and coordinate measurement etc. on components or equipment

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Measurement

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MEM12007D Mark off/out structural fabrications and shapes

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit of competency covers the skills required by an Engineering Tradesperson - Fabrication for transferring the dimensions from the detail drawing to work, making templates as required, developing patterns and/or transferring measurements to structures, interpreting relevant codes, standards and symbols and estimating quantities of material from drawings.

Application of the Unit

Application of the unit	The unit of competency applies to the marking off/out of general fabrications and shapes using appropriate tools and equipment. The marking out is undertaken to specified measurements, tolerances and shapes. Skills covered by this unit are generally applied in occupational and work situations associated with steel fabrication, boilermaking or sheet metal work. This unit has been developed for Engineering Tradesperson - Fabrication apprenticeship training and the recognition of trade level skills in mark off/out of structural fabrications and shapes. All work and work practices are carried out to industry, regulatory and legislative requirements. The task may be performed in the workshop or in situ. Templates and patterns are produced as required. In a marine setting, it includes basic lofting/set out for construction of marine vessels and may include items such as stem and transom development and use of tables of offsets that reflect chine and hull configuration. This may include lofting surfaces, straight edges, string lines, French curves, templates, etc. Marking out techniques may apply to a range of materials and shapes.

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	Where more extensive lofting practices are used, MEM09021B Interpret and produce curved 3-dimensional shapes should be considered. For marking out general engineering components, refer to MEM12006C Mark off/out (general engineering). **Band**: **A** **Unit Weight**: **4**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		
Path 1	MEM12023A	Perform engineering measurements

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Transfer dimensions from a detail drawing to work or surface	1.1. Specifications and work requirements are determined and understood using correct and appropriate calculations 1.2. Marking out is carried out to specifications or standard operating procedures using appropriate tools and equipment 1.3. Datum points are established
2. Make templates/patterns as required	2.1. Appropriate template/pattern material is chosen when required 2.2. Required templates are produced to specifications 2.3. Correct storage procedures are followed including labelling and identification to standard operating procedures
3. Develop patterns and/or transfer measurements to structures	3.1. Most appropriate development and/or measurement sequence is chosen and applied 3.2. Allowances for fabrication and assembly are correctly determined and transferred 3.3. Measurement transfer/layout of components is checked to ensure accuracy/set out
4. Interpret relevant codes, standards and symbols	4.1. Relevant standards/codes and symbols are interpreted 4.2. Requirements of standards/codes are interpreted and applied to materials and processes
5. Estimate quantities of materials from detail drawings	5.1. Materials are correctly identified 5.2. Quantities are estimated from drawing 5.3. Material wastage is minimised

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills

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REQUIRED SKILLS AND KNOWLEDGE

Required skills include:

- reading, interpreting and following information on written job instructions, specifications, standard operating procedures, charts, lists, drawings and other applicable reference documents
- undertaking numerical operations, geometry and calculations/formulae within the scope of this unit
- planning and sequencing operations
- using techniques and equipment required for marking off/out and developing patterns
- checking for conformance to specifications
- establishing and marking datum points
- developing patterns according to specification
- determining fabrication and assembly allowances and transferring to the pattern
- where applicable, applying the requirements of the codes/standards during the geometric development/marking off/out process
- determining material and component quantities from drawings and job specifications
- minimising material wastage

Required knowledge

Required knowledge includes:

- procedures for marking off/out and pattern development
- tools and equipment to be used in the preparation of the marking off/out
- datum points
- materials that can be used for the preparation of templates and their application
- manufacturing allowances that have to be considered when developing patterns
- template labelling and identification procedures
- storage requirements of templates
- appropriate methods of development/marking off/out of a range of given objects
- appropriate fabrication and assembly allowances
- effects of material type and thickness on fabrication and assembly allowances
- sources of data on fabrication and assembly allowances
- relevant standards and codes and the meaning of symbols used
- requirements of the codes/standards applicable to the work to be done
- materials from which the component/assembly is to be manufactured
- benefits of minimising material wastage
- applicable industry standards, national/Australian Standards, NOHSC guides, state/territory regulatory codes of practice/standards
- safe work practices and procedures
- relevant hazards and control measures related to the competency

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Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to mark off/out structural fabrications and shapes. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently apply the skills covered in this unit of competency in new and different workplace situations and contexts. Critical aspects of assessment and evidence include: • examining detailed drawings for fabrication requirements and specifications including materials, measurements and tolerances, joining methods, standards and code requirements • correctly determining sequence of measuring and/or development • correctly establishing and marking datum points • accurately transferring measurements to components • correctly calculating allowances for fabrication and assembly including shrinkage, thickness and inside/outside measurements • accurately producing templates.
Context of and specific resources for assessment	This unit has been developed to support training in and recognition of trade level competency in marking off/out structural fabrications and shapes as applied to a sheet metal or metal fabrication environment. Assessment should emphasise a workplace context and procedures found in the candidate's workplace. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate.

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EVIDENCE GUIDE	
Method of assessment	Typically, persons engaged in Engineering Tradesperson - Fabrication work are required to apply their geometric development skills and techniques across a range of jobs and specifications. A single assessment event is not appropriate. On the job assessment should be included as part of the assessment process wherever possible. Where assessment occurs off the job, judgement must consider evidence of the candidate's performance in a productive work environment that includes a sufficient range of appropriate tasks and materials to cover the scope of application for this unit. Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with marking off/out structural fabrications and shapes or other units requiring the exercise of the skills and knowledge covered by this unit. Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.

Range Statement

RANGE STATEMENT

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RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Equipment	Equipment may include marking out tools as required
Template material	Template material may include: • steel plate • perspex • timber • cardboard • paper
Storage procedures	Storage procedures may include: • labelling • identification (e.g. template lofts)
Allowances	Allowances may include: • thickness • bend • pitch • angle • circumference • perimeter
Standards/codes and symbols	All work carried out in accordance with legislative and regulatory requirements

Unit Sector(s)

Unit sector	

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Co-requisite units

Co-requisite units		

Competency field

Competency field	Measurement

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MEM12023A Perform engineering measurements

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers performing measurement skills requiring straightforward use of mechanical measuring devices and associated calculations.

Application of the Unit

Application of the unit	This unit covers straightforward measurement using devices which incorporate visual indications representing units of measurement. It applies to the use of measuring devices in a range of manufacturing, engineering and related environments. It includes, where required, adjustment of measuring devices through simple means and typically includes zeroing or scale adjustment. Measurements may be expressed in metric or imperial units. All measurements are undertaken to standard operating procedures. Electrical/electronic devices used are those not requiring the connection or disconnection of circuitry. Work is undertaken autonomously or part of team environment, in the field, work station or workshops. For straightforward use of comparison or pre-set measuring devices, Unit MEM12001B (Use comparison and basic measuring devices) should be accessed. **Band**: **A** **Unit Weight**: **5**

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Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Select appropriate device or equipment	1.1. Measurement requirements are determined from specifications. 1.2. Appropriate device or equipment is selected according to standard operating procedures, to achieve required outcome.
2. Obtain measurements using a range of measuring devices	2.1. Correct and appropriate measuring technique is used. 2.2. Measurements are accurately obtained .

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ELEMENT	PERFORMANCE CRITERIA
	2.3. Dimensions are determined or verified using basic calculations, where required.
3. Maintain measuring devices	3.1. Routine care and storage of devices is undertaken to manufacturers' specifications or standard operating procedures. 3.2. Routine adjustments to devices are made and checked.
4. Communicate measurements as required	4.1. Measurements are accurately recorded, where required. 4.2. Freehand sketch which depicts required information is prepared, as required.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Look for evidence that confirms skills in:

- selecting the appropriate measuring device for given measuring tasks
- using appropriate measuring technique
- reading all measurements taken accurately to the finest graduation of the selected measuring device
- handling and storing measuring devices in accordance with manufacturers' specifications or standard operating procedures
- verifying all measuring devices before use
- making, where appropriate, routine adjustments to measuring devices
- reading, interpreting and following information on written job instructions, specifications, standard operating procedures, charts, lists, drawings and other applicable reference documents
- planning and sequencing operations
- checking and clarifying task related information
- checking for conformance to specifications
- undertaking numerical operations involving addition, subtraction, multiplication, division, fractions and decimals within the scope of this unit
- preparing drawings as required

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REQUIRED SKILLS AND KNOWLEDGE
Required knowledge
Look for evidence that confirms knowledge of: • correct application of a range of measuring devices • correct and appropriate measuring technique for a range of measuring devices • addition, subtraction, multiplication, division, fractions, decimals to the scope required by this unit • procedures for handling and storing a range of measuring devices • procedures for adjusting and zeroing a range of measuring devices • methods of communicating measurements by drawings, as required • safe work practices and procedures

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to perform engineering measurements.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication,

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EVIDENCE GUIDE	
	materials handling, recording and reporting associated with performing engineering measurements or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Specifications	Drawings, sketches, job instructions, schematics, diagrams, technical manuals
Range of measuring devices	Protractors, combination squares, set squares, dial indicators, thermometers, tapes, rules, micrometers, vernier-scaled measuring equipment
Basic calculations	Calculations needed to assist in determining measurements where a reading of the graduated device is not sufficient, for example subtracting one measurement from another to give a third

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RANGE STATEMENT	
	measurement. Examples of calculations needed are addition, subtraction, multiplication, division, fractions and decimals. Calculations may be made using a calculator
Routine adjustments	Validating the device using simple zeroing or scale adjustment
Measurements	Measuring length, squareness, flatness, angle, roundness, clearances or any other measurements that can be read off analog, digital or other measuring device
Information	Dimensions, instructions, base line or datum points

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Measurement

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MEM12024A Perform computations

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers estimating approximate answers to arithmetical problems, carrying out basic calculations involving percentages and proportions, and determining simple ratios and averages. The unit includes producing and interpreting simple charts and graphs.

Application of the Unit

Application of the unit	This unit applies in manufacturing, engineering or related environments. It includes the application of the four rules of algebraic expressions, extracting information from drawings, diagrams, graphs and charts and producing simple charts and graphs. Data may be derived from readings taken or may be computer generated. Applications can include computations associated with pressure, volume, temperature, heat, speed, power, elasticity, density, mass, force etc. Calculations may be performed using pen and paper or on a calculator. **Band**: **A** **Unit Weight**: **3**

Licensing/Regulatory Information

Not Applicable

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Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Determine work requirement	1.1. Required outcomes are established from job instructions. 1.2. Data is obtained from relevant sources and interpreted correctly. 1.3. Required calculation method is determined to suit the application, including selection of relevant arithmetic operations and/or formulae. 1.4. Expected results are estimated, including rounding off, as appropriate.
2. Perform calculations	2.1. Calculation method is applied correctly. 2.2. Correct answer is obtained. 2.3. Answer is checked against estimation.

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ELEMENT	PERFORMANCE CRITERIA
3. Produce charts and graphs from given information	3.1. Data is transposed accurately to produce charts or graphs. 3.2. Charts or graphs accurately reflect data on which they are based.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in: • performing calculations involving whole numbers using all four basic rules • performing calculations involving length, perimeter, area and volume • checking calculated answers for accuracy • rounding off estimated answers • expressing information presented in fractional or decimal format as a percentage • selecting appropriate formulae for the given application • substituting the correct values for each term in the relevant formulae • using appropriate mathematical operations • performing calculations involving ratios or proportions • determining required information from appropriate charts or graphs • producing simple charts or graphs from given information or observations made • selecting appropriate scales and using them in the production of charts and graphs • marking appropriate limits clearly on the graph or chart • reading, interpreting and following information on written job instructions, specifications, standard operating procedures, charts, lists, drawings and other applicable reference documents • planning and sequencing operations • checking and clarifying task related information • checking for conformance to specifications • undertaking numerical operations, geometry and calculations/formulae within the scope of this unit
Required knowledge
Look for evidence that confirms knowledge of: • formula applicable to the determination of perimeter, area and volume of simple

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REQUIRED SKILLS AND KNOWLEDGE
geometric shapes • techniques for estimating approximate answers • reasons for using dimensions with the same units when calculating length, perimeter, area and volume • concepts of perimeter, area and volume • procedures for rounding off figures when estimating approximate answers • mixed numbers, decimals, fractions and whole numbers • concept of percentage • procedures to be followed in converting a decimal to a percentage • procedures for carrying out calculations involving fractions and using each of the four basic rules • procedures to be followed on converting a fraction to a percentage • sources of appropriate formulae • reasons for ensuring that the units of each term are consistent with the formulae selected • procedures for converting given units to those required for use in formulae • concepts of ratio and proportion • given ratios and proportions can be expressed in terms of whole numbers, fractions and decimal fractions • scales applicable to the axes of the graphs or charts • three types of charts and/or graphs used in the individual's field of work • where appropriate, upper and lower limits of acceptability applicable to data entered on a graph or chart • where appropriate, the trends indicated by the slope or gradient of a graph • where appropriate, the action to be taken when given trends occur or set limits are approached on graphs or charts • procedures for drawing 'lines of best fit' • the trends indicated by the graphs or charts drawn • hazards and control measures associated with performing computations, including housekeeping • safe work practices and procedures

Evidence Guide

EVIDENCE GUIDE
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

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EVIDENCE GUIDE	
Overview of assessment	A person who demonstrates competency in this unit must be able to perform computations.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with performing computations or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

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Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Relevant sources	Charts, graphs, diagrams, measurement data, reference manuals and specifications
Application	Applications can include computations associated with pressure, volume, temperature, heat, speed, power, elasticity, density, mass, force etc.
Arithmetic operations	• Application of subtraction, addition, multiplication and division • Manipulation of decimals, fractions and mixed numbers and whole numbers • Determining of percentages • Performing of algebraic expressions • Calculation of proportions and ratios
Charts and graphs	Simple histograms, control charts, pie charts etc.

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

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Competency field

Competency field	Measurement

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MEM18001C Use hand tools

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers using a range of hand tools for a variety of general engineering applications.

Application of the Unit

Application of the unit	Applications may include hand tools used for adjusting, dismantling, assembling and finishing of items or components, and the finishing, cutting, scraping of metallic and non-metallic material to size and shape. This includes simple tapping and threading and routine maintenance of hand tools. This unit should not be selected if the hand tool is dedicated to a single operation or machine and if only a machine specific/customised tool is used. When using hand held power tools or power tools used for hand held operations, refer to Unit MEM18002B (Use power tools/hand held operations). **Band**: **A** **Unit Weight**: **2**

Licensing/Regulatory Information

Not Applicable

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Pre-Requisites

Prerequisite units	

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Use hand tools	1.1. Hand tools are selected appropriate to the task requirements. 1.2. Hand tools are used to produce desired outcomes to job specifications which may include finish, tension, size or shape. 1.3. All safety requirements are adhered to before, during and after use. 1.4. Unsafe or faulty tools are identified and marked for repair according to designated procedures before, during and after use. 1.5. Routine maintenance of tools, including hand sharpening is undertaken according to standard

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ELEMENT	PERFORMANCE CRITERIA
	operational procedures, principles and techniques. 1.6. Hand tools are stored safely in appropriate location according to standard operational procedures and manufacturers' recommendations.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in: • reading and following information on standard operating procedures • following verbal instructions • selecting hand tools appropriate to the task • using hand tools safely • identifying hand tool defects and marking for repair • maintaining/sharpening hand tools using appropriate techniques • storing hand tools in accordance with manufacturers'/standard operating procedures
Required knowledge
Look for evidence that confirms knowledge of: • applications of different hand tools in a general engineering context • common faults and/or defects in hand tools • procedures for marking unsafe or faulty tools for repair • routine maintenance requirements for a range of hand tools • storage location and procedures for a range of hand tools • hazards and control measures associated with using hand tools • use and application of personal protective equipment • safe work practices and procedures

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Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to use hand tools for a range of general engineering applications.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with using hand tools or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

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Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Hand tools	Hacksaws, hammers, punches, screwdrivers, sockets, wrenches, scrapers, chisels, gouges, wood planes and files of all cross-sectional shapes and types
Job specifications	Finish, tension, size or shape etc.
Routine maintenance	Cleaning, lubricating, tightening, simple tool repairs, hand sharpening and adjustments using engineering principles, tools, equipment and procedures

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

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Competency field

Competency field	Maintenance and diagnostics

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MEM18002B Use power tools/hand held operations

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers using a range of hand held power tools and fixed power tools for hand held operations for a variety of general engineering applications.

Application of the Unit

Application of the unit	This unit applies to loosening and fastening items or components and shaping, finishing, cutting, grinding metallic and non-metallic materials and/or tool bits to size and shape. This unit should not be selected if the power tools used are dedicated to an operation or machine, e.g. nut-runner, air drill, power driver, etc. For using hand tools, see Unit MEM18001C (Use hand tools). **Band**: **A** **Unit Weight**: **2**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units	

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Prerequisite units	

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Use power tools	1.1. Power tools are selected appropriate to the task requirements. 1.2. Power tools are used for a determined sequence of operations - which may include clamping, alignment and adjustment to produce desired outcomes - to job specifications which may include finish, size or shape. 1.3. All safety requirements are adhered to before, during and after use. 1.4. Unsafe or faulty tools are identified and marked for repair before, during and after use according to designated procedures. 1.5. Operational maintenance of tools, including hand sharpening, is undertaken according to standard

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ELEMENT	PERFORMANCE CRITERIA
	workplace procedures, principles and techniques. 1.6. Power tools are stored safely in appropriate location according to standard workshop procedures and manufacturers' recommendations.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in: • reading and following information on standard operating procedures • following verbal instructions • selecting power tools appropriate to the task • using power tools safely • using clamping/securing devices • identifying power tool defects • maintaining power tools using appropriate techniques • sharpening tools/tool bits within the scope of this unit • storing power tools according to manufacturers'/ standard operating procedures.
Required knowledge
Look for evidence that confirms knowledge of: • application of different power tools • clamping/securing methods • adjustments/alignments to a range of power tools • common faults and/or defects in power tools • procedures for marking unsafe or faulty power tools for repair • routine maintenance requirements of a range of power tools • tool sharpening techniques for a range of power tools • storage location and procedures of a range of power tools • hazards/control measures associated with power tools • use and application of personal protective equipment • safe work practices and procedures

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Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to use power tools/hand held operations.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with using power tools/hand held operations or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning should not require language, literacy and numeracy skills beyond those required in this unit. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.

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EVIDENCE GUIDE	
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Power tools	Electric or pneumatic/hydraulic drills, grinders, jigsaws, nibblers, cutting saws, sanders, planers, routers, pedestal drills and pedestal grinders
Clamping	Multigrips, vices, jigs and fixtures, clamps etc.
Job specifications	Finish, size or shape etc.
Operational maintenance	Hand sharpening, cleaning, lubricating, tightening Simple tool repairs and adjustments using engineering principles, tools, equipment and procedures to statutory and regulatory requirements

Unit Sector(s)

Unit sector	

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Co-requisite units

Co-requisite units		

Competency field

Competency field	Maintenance and diagnostics

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MEM18003C Use tools for precision work

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers using tools to manually produce work to precise dimensions and or finishes.

Application of the Unit

Application of the unit	Work is undertaken autonomously or in a team environment, using predetermined standards of quality, safety and workshop procedures. This unit involves using a variety of tools, instruments and power equipment to perform precision tasks on a range of metallic and non-metallic materials. As a guide, the types of precision work covered by this unit could include: • scraping machine beds to precise tolerances • broaching a tapered keyway • hand reaming the bore of a spigot or bush to a positive transition fit with shaft • core drilling (finishing) a blind locating hole to receive a mating pin • lapping a mechanical seal to fine finish • filing complex angles and mating edges • precision grinding using flex-drive attachment or similar Inspection and preventative maintenance of tools and equipment involves the visual checking of leads and connections, sharpening of cutting equipment and the repair of associated tools. Where precision measurement is required, Unit MEM12003B (Perform precision mechanical measurement) should also be selected. Where precision marking out is required, Unit

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	MEM12006C (Mark off/out [general engineering]) should also be selected. Where specifications are interpreted from engineering drawings, detailed/technical sketches and associated documents, Unit MEM09002B (Interpret technical drawing) should also be selected. **Band**: **A** **Unit Weight**: **4**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		
Path 1	MEM12023A	Perform engineering measurements
	MEM18001C	Use hand tools
	MEM18002B	Use power tools/hand held operations

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range

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	statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Determine job requirements	1.1. Task requirements and specifications are determined and clarified with appropriate persons. 1.2. Processes/techniques are selected appropriate to task, specifications and material.
2. Prepare tools and tooling to produce precision outcome	2.1. Tools, accessories and consumables are selected appropriate to task, specifications and material. 2.2. Where applicable, cutting tool modifications required to produce outcome are determined using engineering principles. 2.3. Tools/tooling are prepared and modified as required.
3. Use tools to produce work to precise specifications	3.1. The work area is prepared and made safe. 3.2. The work piece is prepared and secured using appropriate method for selected operation/s. 3.3. Tools are used according to acceptable engineering principles, methods, applications and procedures to produce specified outcome to the required accuracy. 3.4. Tools and equipment are inspected for safe and proper working order before, during and after use. 3.5. Unserviceable tools/equipment are identified, repaired where appropriate, or marked for repair and/or disposal, according to prescribed procedure. 3.6. Tools are stored and maintained to ensure serviceability.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills

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REQUIRED SKILLS AND KNOWLEDGE

Look for evidence that confirms skills in:

- obtaining and interpreting relevant drawings, specifications, instructions etc.
- preparing and making safe the work area(s) prior to the work being carried out
- using appropriate tools to produce the specified outcomes
- checking tools and equipment for safe and proper working order before, during and after use
- where appropriate, marking unsafe or faulty tools and equipment for repair
- where appropriate, repairing/maintaining unsafe or faulty tools
- checking condition of all tools and equipment for conformance to specifications and safe and proper operation prior to storage
- safely storing all tools and equipment in the appropriate location

Required knowledge

Look for evidence that confirms knowledge of:

- work to be undertaken
- specifications to be achieved
- appropriate tools, processes and equipment required to carry out the work to the required specifications
- reasons for selecting the chosen tools, processes and equipment
- hazards and control measures associated with using the selected tools, processes and equipment, including housekeeping
- safety procedures to be followed to ensure the safety of the individual and other personnel
- procedures for using the selected tools
- engineering principles to be applied during the use of the tools
- manufacturers' specifications of the tools and equipment selected
- safe and proper function of tools and equipment selected
- procedures for checking tools and equipment for correct and safe operation
- common faults and/or defects in tools and equipment used/selected
- procedures for marking unsafe or faulty tools and equipment for repair
- repairs/operational maintenance that can be made to the tools and equipment used/selected
- procedures for repairing/maintaining the tools and equipment used/selected
- procedures for checking tools and equipment prior to storage
- storage location of the tools and equipment used/selected
- procedures for storing tools and equipment used/selected

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Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to use tools to fashion or shape work to high levels of precision for dimension and or finish to specifications. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with using tools for precision work or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.

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EVIDENCE GUIDE	
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Processes	• Hand tools and hand held power tools are used to fashion or shape work to high levels of precision for dimension and or finish to specifications • Engineering techniques, methods and procedures may include cutting out, drilling, fitting, filing, reaming, lapping, broaching, burnishing, scraping, polishing, hand held grinding, chiselling
Precision outcomes	Specified tolerances, allowances, fits, finishes, alignments
Tools	Any tools or equipment required to achieve precision outcomes
Tool modifications	Tool shape, rake angle and clearance angles

Unit Sector(s)

Unit sector	

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Co-requisite units

Co-requisite units		

Competency field

Competency field	Maintenance and diagnostics

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MEM18006C Repair and fit engineering components

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit of competency covers mechanical repair and fitting trade skills including fault finding, repair of faulty components, manufacturing of new parts/components, and fitting mechanical engineering components into assemblies or sub-assemblies to specified measurements and tolerances and consistency with manufacturer's specification. Repair and fitting of engineering components is undertaken using mechanical engineering and maintenance principles, designated procedures, correct and appropriate tools/equipment, and safe working practices.

Application of the Unit

Application of the unit	This unit of competency applies to repair and fitting work undertaken by a tradesperson in a mechanical maintenance, service or workshop environment. Work is undertaken autonomously or as part of a team using predetermined standards of quality, safety and workshop procedures. Skills covered include determining the need for repair or replacement of parts and assemblies, and undertaking of repair, replacement, assembly and final fitting of items, sub-assemblies and assemblies. All specifications are interpreted from engineering drawings, detailed/technical sketches and associated data sheets. The unit includes the use of appropriate workshop practices. New components are manufactured as required to specifications. This unit has been developed for Engineering Tradesperson - Mechanical apprenticeship training and the recognition of trade level skills in repair and fitting of engineering components. Skills covered by this unit are generally applied in occupational and work situations

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	associated with trade level fitting and machining work. It may also apply to other mechanical trade occupational areas requiring high level repair and fit of engineering component skills. This unit has application in the MEM30205 Certificate III in Engineering - Mechanical qualification and other qualifications requiring a trade level of repair and fit skills. This unit does not address machining competencies and welding, if these are required, the appropriate units should also be accessed. Where additional or higher marking out skills are required, refer to MEM12006C Mark off/out (general engineering). The knowledge and skills associated with the installation, removal, repair or replacement of mechanical seals is covered by MEM18012B Perform installation and removal of mechanical seals. For high pressure fluid power seals, refer to MEM18020B Maintain hydraulic system components. **Band**: **A** **Unit Weight**: **6**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		
Path 1	MEM09002B	Interpret technical drawing
	MEM12023A	Perform engineering measurements
	MEM18001C	Use hand tools
	MEM18002B	Use power tools/hand held operations
	MEM18003C	Use tools for precision work

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Prerequisite units		
	MEM18055B	Dismantle, replace and assemble engineering components

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Identify scope of repair and/or fit required	1.1. Operational specifications for components are obtained from appropriate source and are interpreted and understood 1.2. Operation and condition of components are assessed against specifications 1.3. Faulty/worn components are identified 1.4. Causes of faults are determined using appropriate engineering principles, techniques, procedures, tools and equipment 1.5. Repair, replacement, adjustment or manufacture requirements are determined
2. Repair/replace faulty components	2.1. Where applicable, appropriate method of repair is determined 2.2. Where applicable, faulty components are repaired or

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ELEMENT	PERFORMANCE CRITERIA
	adjusted to conform to specifications 2.3. Where applicable, replacement parts are selected from manufacturers' catalogues and assessed against specifications
3. Manufacture parts/components	3.1. Parts/component specifications are determined from appropriate source 3.2. Materials are selected to meet specification requirements 3.3. New components are produced in conformance to specifications using appropriate workshop practices 3.4. Completed components are inspected for compliance with dimensions 3.5. Where appropriate, component parts are marked for identification prior to assembly
4. Fit engineering components into assemblies or sub-assemblies	4.1. Fitting requirements and sequence of assembly are determined 4.2. Appropriate fitting principles and techniques are applied in the preparation and assembly of component parts using fastening equipment and methods which ensures conformance to specifications, operational performance, quality and safety 4.3. Using acceptable engineering practices, correct gland packing, jointing/gasket materials are selected and applied correctly in conformance to specifications and operational requirements 4.4. Correct lubrication requirements are determined by appropriate means and attended to where applicable 4.5. Final adjustments are performed on component assembly to meet operational specifications using acceptable engineering principles, fitting techniques and procedures
5. Check operation of repaired components/unit	5.1. Components/unit are checked under operational conditions for compliance to operational specifications using acceptable engineering principles to standard operating procedures 5.2. Out of specification modification/alterations are approved by appropriate authority and are recorded and documented to standard operating procedures 5.3. Final component assembly is commissioned and returned to service according to standard operating procedures

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- obtaining operational specifications for the components
- assessing operation against specification and identifying faults
- checking components visually and dimensionally against the operational specifications using work site procedures
- checking repaired components visually and dimensionally for conformance to specifications
- adjusting components to achieve conformance to specifications where appropriate
- selecting replacement parts which conform to specifications
- preparing and assembling components using appropriate fitting techniques and principles
- where appropriate, applying gland packing, jointing or gasket materials, using acceptable engineering practices
- applying appropriate lubricants to the assembly using acceptable engineering practices, where required
- checking components for conformance to specification
- where required, adjusting components to achieve conformance to specifications
- where required, recording any approved modifications/alterations to work site procedures
- inspecting the final assembly and checking conformance to operational specifications
- where appropriate, returning the final assembly to service in accordance with work site procedures
- reading, interpreting and following information on written job instructions, specifications, standard operating procedures, charts, lists, drawings and other applicable reference documents
- undertaking numerical operations, geometry and calculations/formulae within the scope of this unit

Required knowledge

Required knowledge includes:

- tools and equipment to be used to dismantle the components
- consequences of having components that do not comply with operational

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REQUIRED SKILLS AND KNOWLEDGE
specifications • types of adjustment applicable to the components being repaired/fitted • appropriate methods of repair • features and/or dimensions upon which replacement parts are to be selected • process of identifying replacement parts from third party suppliers' catalogues • material properties required • manufacturing operations to be used in the production of new components • sequence of operations to be used in the production of new components • fitting requirements for assembling components • appropriate sequence of assembly tasks • purpose of using gland packing, jointing or gasket materials • reasons for selecting particular jointing or packing materials • applications of different types of lubricants • consequences of using inappropriate or no lubricant • the need to have approval for out of specification modifications • reasons for documenting out of specification modifications • return to service procedures • consequences of not following work site return to service procedures • hazard and control measures associated with repairing and fitting engineering components, including housekeeping • safe work practices and procedures

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to repair and fit engineering components to specifications in both workshop and site environments. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently apply the skills covered in this unit of competency in new and different situations and contexts. Critical aspects of assessment and evidence

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EVIDENCE GUIDE	
	include: • obtaining manufacturer's and enterprise specifications for equipment, materials and components • checking components visually and dimensionally in the workplace including tolerances, allowances, clearances and limits • repairing and fitting components and assemblies in a workshop environment to required specifications • repairing and fitting components and assemblies in a production or other work site environment • manufacturing and fitting components including commissioning and return to service checking of component and equipment through first off production or other recognised return to service checking procedure • procedures for out of specification modification/alterations.
Context of and specific resources for assessment	This unit has been developed to support training in and recognition of trade level competency repair and fit of engineering components as applied to a trade level fitting and machining work environment. Assessment should emphasise a workplace context and procedures found in the candidate's workplace. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate.
Method of assessment	Typically, persons engaged in Engineering Tradesperson - Mechanical work are required to apply their repair and fit skills and techniques across a range of jobs and specifications. A single assessment event is not appropriate. On the job assessment should be included as part of the assessment process wherever possible. Where assessment occurs off the job, judgement must consider evidence of the candidate's performance in a productive work environment that includes a sufficient range of appropriate tasks and materials to cover the scope of application for this unit. Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct

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EVIDENCE GUIDE	
	observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials
Guidance information for assessment	This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with repair and fit of engineering components or other units requiring the exercise of the skills and knowledge covered by this unit. Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Manufacturers' catalogues	Manufacturers' catalogues may include any appropriate manufacturers' catalogues that contain replacement parts that conform with specifications and operational requirements
Appropriate workshop practices	Appropriate workshop practices may include: • drilling • scraping

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RANGE STATEMENT	
	• filing • reaming • tapping • threading
Fitting principles and techniques	Fitting principles and techniques may include: • limits of tolerance • allowances and clearances • effects of wear, stress, temperature • types of fits - clearance transition interference • press fitting methods • force fits • shrink and freeze (expansion) fits • keyed fits • taper fits • lateral and radial forces • backlash • configuration and mating of parts • applied use of precision tools and measuring equipment • engineering components - shafts, single and multi-throw crankshafts, cams and journals, bearings and bearing surfaces, keys • squareness, roundness, concentricity, flatness, straightness, surface finish and angular correctness • datum and centrelines • tapping, reaming and broaching

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units	

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Co-requisite units		

Competency field

Competency field	Maintenance and diagnostics

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MEM18007B Maintain and repair mechanical drives and mechanical transmission assemblies

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers diagnosing faults and repairing drives and transmission assemblies, and undertaking final adjustment and commissioning.

Application of the Unit

Application of the unit	This unit applies to diagnostics and maintenance, repair, adjustment and commissioning of mechanical drives and mechanical transmission assemblies. This unit should not be selected where either Unit MEM18042C (Diagnose and rectify manual transmissions), or Unit MEM18043C (Diagnose and rectify automatic transmissions) or Unit MEM18044C (Diagnose and rectify drive line and final drives) are also selected. **Band**: **A** **Unit Weight**: **4**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units	

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Prerequisite units		
Path 1	MEM09002B	Interpret technical drawing
	MEM12023A	Perform engineering measurements
	MEM18001C	Use hand tools
	MEM18002B	Use power tools/hand held operations
	MEM18003C	Use tools for precision work
	MEM18006C	Repair and fit engineering components
	MEM18009B	Perform levelling and alignment of machines and engineering components
	MEM18055B	Dismantle, replace and assemble engineering components

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Undertake maintenance checks of mechanical drives and mechanical transmission components	1.1. Principles of mechanical drives and mechanical transmission components are understood. 1.2. The function of the main parts of the designated mechanical drive/transmission assembly is understood. 1.3. Appropriate maintenance principles, techniques, tools and equipment, mechanical drive/transmission components are used to check for wear, distortion, tensions, misalignment, fatigue, lubrication, slackness, tooth wear, breakages and other related malfunctions. 1.4. Assembly requiring further diagnosis, repair or adjustment is identified and findings are documented.
2. Adjust mechanical drives and transmission assemblies	2.1. Adjustment requirements are determined. 2.2. A suitable adjustment method is determined from manufacturers' instruction sheets, standard workshop manuals/procedures or other means. 2.3. Adjustment tools and equipment are selected according to the type of assembly being serviced. 2.4. Appropriate maintenance principles, techniques, tools and equipment are used, and drives/transmission components are tensioned, aligned balanced or adjusted to manufacturers'/site specifications according to safe workshop practices. 2.5. Drive/transmission assembly is checked after adjustment for correct operation or identified for further diagnosis or repair. 2.6. Service report is completed. 2.7. Further diagnosis or repair requirements are actioned.
3. Diagnose faults	3.1. Service reports are read and visual and sensory inspection of the drive/transmission assembly is undertaken. 3.2. Given manufacturers' specifications, and where applicable, diagnostic equipment drive/transmission assembly is tested using sound maintenance principles and procedures. 3.3. Faults are localised at the component level and identified for repair or replacement. 3.4. Fault causes are analysed and preventative measures

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ELEMENT	PERFORMANCE CRITERIA
	to avoid re-occurrence are developed, documented and actioned by appropriate means. 3.5. Requirements for repair or replacement are actioned.
4. Repair mechanical drives/transmission assemblies	4.1. Service reports are read and visual and sensory inspection of the drive/transmission assembly is undertaken. 4.2. Task requirements are ascertained. 4.3. Tools and equipment are selected according to the type of assembly being serviced. 4.4. Mechanical drive/transmission assembly is dismantled using appropriate maintenance principles, techniques, tools, equipment and safe workshop practices. 4.5. Serviceable items are repaired using appropriate maintenance procedures according to manufacturers' specifications and standard workshop practices. 4.6. Standard replaceable items are selected and obtained using manufacturers' catalogues, spare parts lists, engineering specifications. 4.7. Component parts are refitted to mechanical drive/transmission assembly using sound maintenance principles, techniques, tools and equipment in accordance with manufacturers'/site specifications.
5. Final adjustment and commissioning	5.1. Using applicable maintenance principles and procedures, drive/transmission components are tensioned, balanced, aligned or adjusted to suit specifications and operational requirements. 5.2. Drive/transmission assembly is checked after adjustment and operational performance is analysed. 5.3. Assembly is commissioned to specifications. 5.4. Service report is completed.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.

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REQUIRED SKILLS AND KNOWLEDGE

Required skills

Look for evidence that confirms skills in:

- locating, reading and interpreting information on written job instructions, specifications, manufacturers' instructions, standard workshop manuals/procedures, drawings, charts, lists and other reference documentation
- checking and clarifying task-related information
- interpreting manufacturers' catalogues or engineering specifications
- undertaking diagnostic and testing
- analysing operational performance
- planning and sequencing operations
- completing proformas, standard workplace forms and short reports using relevant terminology
- checking for conformance to specifications
- measuring components to specified tolerances
- undertaking calculations for determining cutting parameters and checking tolerances
- undertaking numerical operations and engineering calculations/formulae within the scope of this unit
- following verbal instructions
- orally reporting information

Required knowledge

Look for evidence that confirms knowledge of:

- uses and characteristics of lubricants
- principles of operation of a range of mechanical drives and transmissions
- techniques, tools and equipment to measure components
- common malfunctions in mechanical drives, transmissions and their components
- procedures for checking and adjusting mechanical drives, transmissions and their components
- preventative measures that can be undertaken to avoid recurrence of the fault/failure
- any applicable industry standards, national/Australian standards, NOHSC guidelines, State/Territory regulatory codes of practice/standards
- use and application of personal protective equipment
- safe work practices and procedures
- hazards and control measures associated with maintaining and repairing mechanical drives and mechanical transmission assemblies

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Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to diagnose faults and repair drives and transmission assemblies and undertake final adjustment and commissioning. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with maintaining/repairing mechanical drives and mechanical transmission assemblies or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes,

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EVIDENCE GUIDE	
	standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Mechanical drive/transmission	Worm and worm wheel, line shafts, plumber blocks, pulleys, sprockets, belts, taper bush assemblies, roller chains, chain drives, mechanical and hydraulic couplings, compression couplings, disc type flexible couplings, spider type, chain couplings, universal joints, bevel gearing, rack and pinion gearing, dog toothed clutches, cone type clutches, expanding shoe type clutches, friction/plate type clutches, centrifugal clutches, toggle action linkages, magnetic clutches, sprag clutches, band type brakes and other associated drive components.
Service reports	According to workplace procedures
Sensory inspection	Vibration, heat, smell, sound, sight
Commissioned	Confirming readiness for use or return to service

Unit Sector(s)

Unit sector	

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Co-requisite units

Co-requisite units		

Competency field

Competency field	Maintenance and diagnostics

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MEM18009B Perform levelling and alignment of machines and engineering components

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers undertaking levelling and alignment measurements/readings and performing levelling and/or alignment tasks.

Application of the Unit

Application of the unit	This unit applies to the setting up and use of alignment measuring devices and precision levelling devices. All adjustments are performed according to designated procedures in conformance to specifications. The application of appropriate engineering principles, techniques, tools and equipment is integral to all tasks relating to the levelling of equipment and the alignment of component parts. **Band**: **A** **Unit Weight**: **4**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		
Path 1	MEM09002B	Interpret technical drawing

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Prerequisite units		
	MEM12023A	Perform engineering measurements
	MEM18001C	Use hand tools
	MEM18002B	Use power tools/hand held operations
	MEM18003C	Use tools for precision work
	MEM18006C	Repair and fit engineering components
	MEM18055B	Dismantle, replace and assemble engineering components

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Undertake levelling and alignment measurements/readings	1.1. Principles of levelling and alignment are understood and utilised. 1.2. Task requirements are determined by inspection of equipment to be levelled and/or components to be

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ELEMENT	PERFORMANCE CRITERIA
	aligned. 1.3. The correct appropriate levelling and/or alignment procedure is selected. 1.4. Correct and appropriate levelling or alignment devices/equipment are selected and set up to standard operating procedures or manufacturers' recommendation. 1.5. Measurements/readings are taken accurately and recorded correctly to standard operating procedures.
2. Perform levelling and/or alignment tasks	2.1. Correct and appropriate engineering principles, techniques, tools and equipment are selected. 2.2. Levelling realignment calculations are performed using correct and appropriate method for levelling/alignment application. 2.3. Equipment is levelled to specifications using correct and appropriate techniques 2.4. Levelling and alignment task is completed to specifications.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in: • reading, interpreting and following information on standard operating procedures, manufacturer recommendations, drawings and other applicable reference documents • taking levelling and alignment measurements/readings • performing levelling/alignment calculations • setting up levelling/aligning equipment • completing levelling and/or alignment tasks
Required knowledge
Look for evidence that confirms knowledge of:

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REQUIRED SKILLS AND KNOWLEDGE
• principles of levelling and alignment • numerical operations, geometry and calculations/formulae for levelling and alignment • effects on equipment performance and life of non-level or out of alignment components • techniques, tools, equipment and procedures to carry out the levelling and/or alignment • reasons for selecting tools, techniques and equipment • hazards and control measures associated with levelling and alignment • use and application of personal protective equipment • safe work practices and procedures

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to level and align machines and engineering components. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other

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EVIDENCE GUIDE	
	units addressing the safety, quality, communication, materials handling, recording and reporting associated with levelling and aligning machines and engineering components or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Levelling and/or alignment procedures	Face and rim, reverse indicator, use of jacking bolts and shimming material, straight edge and feeler gauge, use of levelling equipment, etc.
Levelling and alignment devices/equipment	Precision levels, spirit levels, line levels, optical levels, electronic levels, laser levels, dial indicators, special type dial indicator fixtures, magnetic bases, feeler gauges, bench centres, vee blocks, plumb line, folding wedges, straight

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RANGE STATEMENT	
	edges, shimpack materials, dumpy levels etc.
Level or realignment calculation	Performed using the most appropriate means for the type of application being performed
Specifications	Obtained from engineering drawings, data sheets or manufacturers' specifications

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Maintenance and diagnostics

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MEM18010C Perform equipment condition monitoring and recording

Modification History

Single band identifier removed to clarify dual status

Unit Descriptor

Unit descriptor	This unit covers undertaking condition monitoring.

Application of the Unit

Application of the unit	This unit applies where specialist monitoring activities are undertaken as part of a preventive maintenance or total productive maintenance plan or program. Work is undertaken autonomously or as part of a team environment. Monitoring is undertaken in workshop, laboratory or in situ environment; readings are undertaken to the accuracy of monitoring equipment limitations or to site specifications where applicable. Results are recorded/plotted to predetermined procedure and technique. All work and work procedures are undertaken to standard operating procedures and/or equipment manufacturers' recommendations. All work and work practices are undertaken to regulatory or legislative requirements. Where only routine maintenance checking and diagnostic skills are applied, other appropriate units should be accessed. **Band:** This unit has dual status and is to be regarded as both a Specialisation band A unit and Specialisation band B unit for progression to C5 (AQF level V). **Unit Weight**: **4**

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Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		
Path 1	MEM09002B	Interpret technical drawing
	MEM12023A	Perform engineering measurements
	MEM18001C	Use hand tools
	MEM18002B	Use power tools/hand held operations
	MEM18055B	Dismantle, replace and assemble engineering components

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Undertake condition	1.1. Principles and methods of equipment condition

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ELEMENT	PERFORMANCE CRITERIA
monitoring	monitoring are understood and applied 1.2. Appropriate condition monitoring technique is selected to achieve required outcomes. 1.3. Checks are undertaken correctly, safely and to standard operating procedures. 1.4. Results are plotted and deviations from specification are reported to appropriate authority and recorded.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in: • reading, interpreting and following information on job instructions, specifications, standard operating procedures, charts, lists, drawings and other applicable reference documents • planning and sequencing operations • checking and clarifying task-related information • applying correct principles for monitoring • selecting appropriate technique for the situation • following standard operating procedures • recording results and preparing and submitting deviation reports
Required knowledge
Look for evidence that confirms knowledge of: • the application of principles and methods for a variety of situations • appropriate records for a variety of situations • hazards and control measures associated with equipment monitoring, including housekeeping • use and application of personal protective equipment • safe work practices and procedures

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Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to perform equipment condition monitoring and recording. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both. Where assessment occurs off the job, i.e. the candidate is not in productive work, an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with equipment condition monitoring and recording or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.

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EVIDENCE GUIDE	
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Technique may include	Built-in systems (software and site displays), vibration monitors, infra-red and ultraviolet non-destructive testing

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

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Competency field

Competency field	Maintenance and diagnostics

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MEM18018C Maintain pneumatic system components

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers checking pneumatic system components, and identifying and repairing or replacing faulty components.

Application of the Unit

Application of the unit	Pneumatic system components are identified, inspected and assessed using fluid power principles to predetermined specifications interpreted from data sheets and circuits diagrams. Work is undertaken using predetermined standards of safety, quality and work procedures. Correct operational function of equipment components is confirmed and commissioned in conformance with specification, using standard operating procedures. For straightforward removals/replacement of components from a pneumatic system, Unit MEM18055B (Dismantle replace and assemble engineering components) or Unit MEM18071B (Connect/disconnect fluid conveying system components) should be regarded as sufficient. **Band**: **A** **Unit Weight**: **4**

Licensing/Regulatory Information

Not Applicable

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Pre-Requisites

Prerequisite units		
Path 1	MEM09002B	Interpret technical drawing
	MEM12023A	Perform engineering measurements
	MEM18001C	Use hand tools
	MEM18002B	Use power tools/hand held operations
	MEM18003C	Use tools for precision work
	MEM18006C	Repair and fit engineering components
	MEM18055B	Dismantle, replace and assemble engineering components

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**

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ELEMENT	PERFORMANCE CRITERIA
1. Check pneumatic system components	1.1. System components are identified correctly. 1.2. The characteristics and operational function of each system component are understood. 1.3. The operational function of each component is inspected and tested. 1.4. Correct operation of each component is assessed against specifications.
2. Identify, repair or replace faulty pneumatic system components	2.1. Faulty system components are localised and malfunction is confirmed by inspection and testing using fluid power principles, procedures and safety requirements. 2.2. Faulty system components are dismantled and repaired to manufacturers'/site specifications. 2.3. Replacement parts are selected from manufacturers' catalogue according to required specifications. 2.4. System components are reassembled and verified for correct operation and tested against specifications. 2.5. Correct operation of the pneumatic system is confirmed to standard operating procedures. 2.6. Appropriate follow-up procedures are adopted according to standard operating procedures. 2.7. Where appropriate, service reports are completed using standard operating procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in: • inspecting and testing pneumatic system components • obtaining, interpreting and following written job instructions, specifications, standard operating procedures, charts, lists, drawings, relevant data sheets and other applicable reference documents • planning and sequencing operations • checking and clarifying task-related information

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REQUIRED SKILLS AND KNOWLEDGE
• checking individual components within the pneumatic system for correct operation • dismantling and repairing faulty system components • selecting replacement parts from manufacturers'/suppliers' catalogues • assembling pneumatic system components • testing pneumatic components for correct operation and conformance to specifications • checking the operation of the pneumatic system for conformance to specification • checking repaired/replaced pneumatic system components for correct operation • completing service reports
Required knowledge
Look for evidence that confirms knowledge of: • the full range of pneumatic system components • characteristics/operational function of each component • procedures for inspecting and testing pneumatic system components • equipment to test pneumatic system components • the specifications of each pneumatic system component • faulty system components • causes of faulty pneumatic components • individual components within the pneumatic system • the safety procedures for working on pneumatic components • the procedure for repairing pneumatic system components • procedures for checking pneumatic system operation • follow-up procedures with respect to repaired/replaced pneumatic system components • reporting/recording procedures • hazard and control measures associated with maintaining pneumatic system components, including housekeeping • safe work practices and procedures

Evidence Guide

EVIDENCE GUIDE
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

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EVIDENCE GUIDE	
Overview of assessment	A person who demonstrates competency in this unit must be able to maintain pneumatic system components. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with maintaining pneumatic system components or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

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Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Pneumatic system components	Static and dynamic seals, linear and semi-rotary actuators, pressure control valves, directional control valves, flow control valves, normally open and closed timers, counters, pneumatic motors, fluid conductors and other associated equipment
Repair/replace	Repairs and replacements are conducted to site or manufacturers' specifications

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Maintenance and diagnostics

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MEM18019B Maintain pneumatic systems

Modification History

Single band identifier removed to clarify dual status

Unit Descriptor

Unit descriptor	This unit covers undertaking preventive maintenance checks/adjustments on pneumatic systems, and fault finding, replacing, repairing or overhauling, and recommissioning pneumatic systems.

Application of the Unit

Application of the unit	The use of hand tools, power tools and specialist tools is included. Work tasks include preventative maintenance; testing diagnostic fault finding; adjustment, repair, replacement and overhauling of pneumatic systems to predetermined standards of quality, safety and work practices and procedures. Pneumatic components are identified, inspected and correct operational function is assessed using fluid power principles to predetermined specifications, interpreted from data sheets, manufacturers' catalogues, circuit diagrams and engineering drawings. Tests, checks, adjustments, repair, replacement and overhaul are undertaken on pneumatic assemblies/sub-assemblies, stationary/mobile equipment, pneumatic power tools according to site or manufacturers' specifications. Appropriate follow-up procedures are instigated, adopted and appropriate documentation is maintained. Work is undertaken autonomously or in a team environment. **Band:** This unit has dual status and is to be regarded as both a Specialisation band A unit and Specialisation band B unit for progression to C5 (AQF level V).

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	Unit Weight: **4**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		
Path 1	MEM09002B	Interpret technical drawing
	MEM12023A	Perform engineering measurements
	MEM18001C	Use hand tools
	MEM18002B	Use power tools/hand held operations
	MEM18003C	Use tools for precision work
	MEM18006C	Repair and fit engineering components
	MEM18018C	Maintain pneumatic system components
	MEM18055B	Dismantle, replace and assemble engineering components

Employability Skills Information

Employability skills	This unit contains employability skills.

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Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Undertake preventative maintenance checks/adjustments on pneumatic systems	1.1. System components, assemblies or sub-assemblies are identified and prepared for inspection/preventative maintenance. 1.2. Visual inspection and testing with appropriate test equipment are carried out according to fluid power principles, procedures and safety requirements. 1.3. Scheduled preventative maintenance tasks are performed including obvious repairs and adjustments according to manufacturers' specification using fluid power techniques/practices.
2. Undertake fault finding on pneumatic systems	2.1. Designated pneumatic system components are identified and a visual inspection of the system is carried out for the collection of fault finding data. 2.2. System operator is consulted where appropriate and additional data is collected. 2.3. Maintenance reports and preventative maintenance schedules are checked and reviewed for additional fault finding data. 2.4. Using fluid power principles, checks and tests are undertaken using appropriate test equipment and techniques. 2.5. Faults and malfunctions are identified and verified. 2.6. Faults and malfunctions are documented or reported by appropriate means to designated personnel and actioned.
3. Repair and/or overhaul pneumatic power system	3.1. System or sub-assembly is isolated safely and residue pressure is discharged in accordance with prescribed procedures or checked for correct isolation. 3.2. Isolated system or sub-assembly is tagged according

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ELEMENT	PERFORMANCE CRITERIA
	to designated means. 3.3. Component or sub-assembly is removed from system using correct removal principles and techniques. 3.4. Components or sub-assemblies are dismantled, examined and verified for replacement, overhaul or repair, using correct and appropriate techniques and procedures. 3.5. Replacement items are selected from manufacturers' catalogues to meet specifications 3.6. Faulty items are repaired/replaced/overhauled, using correct and appropriate principles, techniques and procedures. 3.7. Component or sub-assembly items are refitted to equipment and tested for correct operation assessed against specifications.
4. Recommission pneumatic system	4.1. System or sub-assembly is recommissioned according to prescribed procedures and specifications. 4.2. Using fluid power principles and system application techniques, correct operation of the system is verified. 4.3. Appropriate follow-up procedures are instigated. 4.4. Maintenance records/service reports are updated and completed by appropriate designated means.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in: • preparing pneumatic system components for inspection/preventative maintenance • inspecting and testing pneumatic system and components • performing scheduled preventative maintenance tasks • performing repairs on the pneumatic system/components as required • visually inspecting pneumatic system and its components for indications of

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REQUIRED SKILLS AND KNOWLEDGE
correct/incorrect operation • consulting system operator with respect to the fault being investigated • obtaining and interpreting maintenance reports and preventative maintenance schedules • checking/testing pneumatic system/component operation • verifying/confirming apparent faults/malfunctions • documenting or reporting verified faults/malfunctions • initiating repair/overhaul of the pneumatic system • isolating and depressurising pneumatic system • checking pneumatic system to ensure isolation and depressurisation • tagging isolated pneumatic system • removing pneumatic components/sub-assembly from the system • dismantling pneumatic components/sub-assemblies • examining pneumatic components/sub-assemblies and their parts for conformance to specification • selecting replacement parts selected from manufacturers' catalogues • overhauling faulty items • refitting pneumatic component/sub-assembly into the system • testing pneumatic component/sub-assembly for correct operation • recommissioning pneumatic system/sub-assembly to specification • checking/testing pneumatic system/sub-assembly for correct operation • initiating follow-up procedures • updating and completing maintenance records/reports
Required knowledge
Look for evidence that confirms knowledge of: • common pneumatic system components • pneumatic system/component faults that can be determined by visual inspection • the application of common pneumatic system/component test equipment • scheduled preventative maintenance tasks • manufacturers' specifications • common pneumatic system and component faults • any previous faults in the pneumatic system/components • any previous maintenance carried out on the pneumatic system/components • typical checks/tests that can be carried out on pneumatic systems/components and their application • pneumatic system/component tests and testing techniques • apparent faults/malfunctions • documentation/reporting requirements with respect to verified faults/malfunctions • procedures for initiating repair and/or overhaul of the pneumatic system

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REQUIRED SKILLS AND KNOWLEDGE
• hazards associated with working on pneumatic systems/components, including housekeeping • the procedures for isolating and depressurising pneumatic systems • the tagging requirements for isolated systems • the structure of typical pneumatic components • specifications of pneumatic components and their constituent parts • reasons for deciding to repair, replace or overhaul pneumatic components • system recommissioning procedures • the pneumatic system operational specifications • any appropriate follow-up maintenance or operational checks • maintenance recording/reporting requirements • consequences of inaccurate or incomplete recording/reporting of maintenance/service activities • pneumatic principles • safe work practices and procedures

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to maintain pneumatic systems. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this

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EVIDENCE GUIDE	
	unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with maintaining and repairing pneumatic systems or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Preventative maintenance checks	Preventative maintenance is undertaken on a periodic basis and appropriate documentation is maintained
Systems	For the purposes of this unit, a system is regarded

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RANGE STATEMENT	
	as a functionally related group of elements. The unit extends to tests involving interacting, interrelated, or interdependent components
Test equipment	Leak testers, escape rate gauges, hand held pressure testers and other appropriate equipment
Repair	Rectify, replace components, determine for reuse

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Maintenance and diagnostics

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MEM18020B Maintain hydraulic system components

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers checking hydraulic system components, and identifying and repairing or replacing faulty components.

Application of the Unit

Application of the unit	Hydraulic system components are identified, inspected and assessed using fluid power principles to predetermined specifications interpreted from data sheets and circuits diagrams. Work is undertaken using predetermined standards of safety, quality and work procedures. Repairs and replacements are undertaken to site or manufacturers' specifications. Correct operational function of equipment components is confirmed and commissioned in conformance to specifications, using standard operating procedures. For straightforward removals/replacement of components from a hydraulic system, Unit MEM18055B (Dismantle replace and assemble engineering components) or Unit MEM18071B (Connect/disconnect fluid conveying system components) should be regarded as sufficient. **Band**: **A** **Unit Weight**: **4**

Licensing/Regulatory Information

Not Applicable

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Pre-Requisites

Prerequisite units		
Path 1	MEM09002B	Interpret technical drawing
	MEM12023A	Perform engineering measurements
	MEM18001C	Use hand tools
	MEM18002B	Use power tools/hand held operations
	MEM18003C	Use tools for precision work
	MEM18006C	Repair and fit engineering components
	MEM18055B	Dismantle, replace and assemble engineering components

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**

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ELEMENT	PERFORMANCE CRITERIA
1. Check hydraulic system components	1.1. System components are identified correctly. 1.2. The characteristics and operational function of each system component are understood. 1.3. The operational function of each component is inspected and tested. 1.4. Correct operation of each component is assessed against specifications.
2. Identify and repair or replace faulty hydraulic system components	2.1. Faulty system components are localised and malfunction is confirmed by inspection and testing using fluid power principles, procedures and safety requirements. 2.2. Faulty system components are dismantled and rectified to manufacturers'/site specifications. 2.3. Replacement parts are selected from manufacturers' catalogues according to required specifications. 2.4. System components are reassembled and tested for correct operation and assessment against specifications. 2.5. Correct operation of the hydraulic system is confirmed to designated operating procedure. 2.6. Appropriate follow-up procedures are adopted according to standard operating procedures. 2.7. Where appropriate, service reports are completed using standard operating procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in: • inspecting a range of hydraulic system components in accordance with standard operating procedures • reading, interpreting and following relevant data sheets, specifications, hydraulic circuits, drawings, instructions and manuals • checking the individual components within the hydraulic system for correct

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REQUIRED SKILLS AND KNOWLEDGE
operation • dismantling and rectifying faulty system components to manufacturers'/site specifications in accordance with standard operating procedures • where appropriate, selecting replacement parts from the manufacturers'/suppliers' catalogues • reassembling and testing the hydraulic system components • checking the operation of the hydraulic system for conformance to specification • checking repaired/replaced hydraulic system components for correct operation • completing service reports where appropriate
Required knowledge
Look for evidence that confirms knowledge of: • the full range of hydraulic system components • characteristics and operational function of each hydraulic system component • procedures for inspecting and testing hydraulic system components • equipment required to test hydraulic system components • specifications of each hydraulic system component • hydraulic components not operating in accordance with specifications • reasons for hydraulic components not operating in accordance with specification • individual components within the hydraulic system • safety procedures to be followed when working on hydraulic components • where appropriate, faulty system components • procedure for repairing hydraulic system components • parts to be replaced • reasons for replacing the parts identified • the correct operation of the hydraulic system • procedures for checking hydraulic system operation • where appropriate, the follow-up procedures with respect to repaired/replaced hydraulic system components • reporting/recording procedures • reasons for completing service reports for hydraulic system components repaired/replaced • hazards associated with maintaining hydraulic system components, including housekeeping • safe work practices and procedures

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Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to maintain hydraulic system components. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with maintaining hydraulic system components or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.

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EVIDENCE GUIDE	
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Hydraulic system components	Hydraulic system components may include static and dynamic seals, linear and semi-rotary actuators, fixed displacement and variable displacement pumps, pressure control valves, directional control valves, flow control valves, hydraulic motors, reservoirs, contamination control components (filtration), fluid conductors/fittings and other associated equipment.

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

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Co-requisite units		

Competency field

Competency field	Maintenance and diagnostics

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MEM18021B Maintain hydraulic systems

Modification History

Single Band identifier removed to clarify dual status

Unit Descriptor

Unit descriptor	This unit covers undertaking preventive maintenance checks/adjustments on hydraulic systems, and fault finding, repairing, rectifying or overhauling, and recommissioning hydraulic systems.

Application of the Unit

Application of the unit	The use of hand tools, power tools and specialist tools is included. Work tasks include the preventative maintenance, testing, diagnostic fault finding, adjustment, repair, replacement and overhauling of hydraulic systems to predetermined standards of quality, safety and work practices and procedures. Hydraulic components are identified, inspected and correct operational function is assessed using fluid power principles to predetermined specifications, interpreted from data sheets, manufacturers' catalogues, circuit diagrams and engineering drawings. Appropriate follow-up procedures are instigated, adopted and appropriate documentation is maintained. Work is undertaken autonomously or in a team environment. **Band:** This unit has dual status and is to be regarded as both a Specialisation band A unit and Specialisation band B unit for progression to C5 (AQF level V). **Unit Weight**: **4**

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Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		
Path 1	MEM09002B	Interpret technical drawing
	MEM12023A	Perform engineering measurements
	MEM18001C	Use hand tools
	MEM18002B	Use power tools/hand held operations
	MEM18003C	Use tools for precision work
	MEM18006C	Repair and fit engineering components
	MEM18020B	Maintain hydraulic system components
	MEM18055B	Dismantle, replace and assemble engineering components

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Undertake preventative maintenance checks/adjustments on hydraulic systems	1.1. System components, assemblies or sub-assemblies are identified and prepared for inspection/preventative maintenance. 1.2. Visual inspection and testing with appropriate test equipment are carried out according to fluid power principles, procedures and safety requirements. 1.3. Scheduled preventive maintenance tasks are performed including obvious repairs and adjustments according to manufacturers' specifications using fluid power techniques/practices.
2. Undertake fault finding on hydraulic systems	2.1. Designated hydraulic system components are identified and a visual inspection of the system is carried out for the collection of fault finding data. 2.2. System operator is consulted where appropriate and additional data is collected. 2.3. Maintenance reports and preventative maintenance schedules are checked and reviewed for additional fault finding data. 2.4. Using fluid power principles, checks and tests are undertaken using appropriate test equipment and techniques. 2.5. Faults and malfunctions are identified and verified. 2.6. Faults and malfunctions are documented or reported by appropriate means to designated personnel and actioned.
3. Repair and/or rectify hydraulic system	3.1. System or sub-assembly is isolated safely and residue pressure is discharged in accordance with prescribed procedure and checked for correct isolation. 3.2. Isolated system or sub-assembly is tagged according to designated means. 3.3. Components or sub-assembly is removed from system using correct removal principles and techniques. 3.4. Components or sub-assemblies are dismantled, examined and verified for replacement, overhaul or repair, using correct and appropriate techniques and

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ELEMENT	PERFORMANCE CRITERIA
	procedures. 3.5. Replacement items are selected from manufacturers' catalogues to meet specifications. 3.6. Faulty items are rectified using correct and appropriate principles, techniques and procedures. 3.7. Component or sub-assembly items are refitted to equipment and tested for correct operation against specifications.
4. Recommission hydraulic system	4.1. System or sub-assembly is recommissioned according to prescribed procedures and specifications. 4.2. Using fluid power principles and system applications techniques, correct operation of the system is verified. 4.3. Appropriate follow-up procedures are instigated. 4.4. Maintenance records/service reports are updated and completed by appropriate designated means.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in: • preparing hydraulic system components for inspection/preventative maintenance • inspecting and testing the hydraulic system/components • planning and sequencing operations • performing scheduled preventative maintenance tasks • where appropriate, performing obvious repairs on the hydraulic system/components • visually inspect the hydraulic system and its components for indications of correct/incorrect operation • where appropriate, consulting with the system operator with respect to the fault being investigated • obtaining and interpreting maintenance reports and preventative maintenance schedules • using appropriate test equipment and techniques to check/test hydraulic

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REQUIRED SKILLS AND KNOWLEDGE
system/component operation • verifying apparent faults/malfunctions • documenting or reporting all verified faults/malfunctions • initiating the repair/overhaul of the hydraulic system • isolating and depressurising the hydraulic system • tagging the isolated hydraulic system • removing the hydraulic components/sub-assembly from the system • dismantling the hydraulic components/sub-assemblies • examining the hydraulic components/sub-assemblies and their parts for conformance to specification • selecting replacement parts from manufacturers' catalogues in compliance with specifications • repairing/replacing/overhauling faulty items • refitting the hydraulic component/sub-assembly into the system • testing the hydraulic component/sub-assembly for correct operation and compliance with specifications • recommissioning the hydraulic system/sub-assembly to specification • checking/testing the hydraulic system/sub-assembly for correct operation • where appropriate, initiating follow-up procedures • updating and completing all maintenance records/reports
Required knowledge
Look for evidence that confirms knowledge of: • common hydraulic system components • hydraulic system/component faults that can be determined by visual inspection • the application of common hydraulic system/component test equipment • schedule of preventative maintenance tasks • the manufacturers' specifications • common hydraulic system and component faults • any previous faults in the hydraulic system/components • any previous maintenance carried out on the hydraulic system/components • typical checks/tests that can be carried out on hydraulic systems/components and their application • hydraulic system/component test and testing techniques • apparent faults/malfunctions • the documentation/reporting requirements with respect to verified faults/malfunctions • the procedures for initiating repair/replacement and/or overhaul of the hydraulic system • the hazards and control measures associated with working on hydraulic systems/components, including housekeeping

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REQUIRED SKILLS AND KNOWLEDGE
• the procedures for isolating and depressurising hydraulic systems • tagging requirements for isolated systems • the structure of typical hydraulic components • the specifications of hydraulic components and their constituent parts • the appropriate repair/overhaul procedures • system recommissioning procedures • the hydraulic system operational specifications • any appropriate follow-up maintenance or operational checks • the maintenance recording/reporting requirements • the consequences of inaccurate or incomplete recording/reporting of maintenance/service activities • safe work practices and procedures

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to maintain hydraulic systems. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate.

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EVIDENCE GUIDE	
	This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with maintaining and repairing hydraulic systems or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Preventative maintenance	Preventative maintenance is undertaken on a periodic basis and appropriate documentation is maintained
Systems	For the purposes of this unit a system is regarded as a functionally related group of elements. The unit extends to tests involving interacting, interrelated, or interdependent components

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RANGE STATEMENT	
Test equipment	Leak testers, escape rate gauges, hand held pressure testers and other appropriate equipment
Rectify	Replacement, repair and/or reuse of components

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Maintenance and diagnostics

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MEM18022B Maintain fluid power controls

Modification History

Single band identifier removed to clarify dual status

Unit Descriptor

Unit descriptor	This unit covers installing and repairing and/or rectifying fluid power controls, and adjusting fluid power system control sequence and operation.

Application of the Unit

Application of the unit	It also covers fault finding of fluid power systems control circuits, maintaining and repairing or replacing system control components and checking and adjusting the sequence of fluid power system controls. System circuit/components are identified, traced, inspected and operational function is assessed and verified using fluid power principles to predetermined specifications interpreted from data sheets and circuit diagrams. Work is undertaken using predetermined standards of quality, safety and work procedures, autonomously or in a team environment. Installation, adjustment, repairs, replacements and overhauls are undertaken to site or manufacturers' specifications using working knowledge and application of principles of fluid power systems control sequencing which may include: PLCs, relay logic control systems, unitised/modular sensors, transducers, timers, counters and associated equipment. If skills beyond the sequencing of PLC controls are required, then Units MEM10004B (Enter and change programmable controller operational parameters) and/or Unit MEM10005B (Commission programmable controller programs) should also be accessed. **Band:** This unit has dual status and is to be regarded as both a Specialisation band A unit and Specialisation band B unit

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	for progression to C5 (AQF level V). **Unit Weight**: **8**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		
Path 1	MEM09002B	Interpret technical drawing
	MEM12023A	Perform engineering measurements
	MEM18001C	Use hand tools
	MEM18002B	Use power tools/hand held operations
	MEM18003C	Use tools for precision work
	MEM18006C	Repair and fit engineering components
	MEM18018C	Maintain pneumatic system components
	MEM18019B	Maintain pneumatic systems
	MEM18055B	Dismantle, replace and assemble engineering components
Path 2	MEM09002B	Interpret technical drawing
	MEM12023A	Perform engineering measurements
	MEM18001C	Use hand tools
	MEM18002B	Use power tools/hand held operations
	MEM18003C	Use tools for precision work

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Prerequisite units		
	MEM18006C	Repair and fit engineering components
	MEM18020B	Maintain hydraulic system components
	MEM18021B	Maintain hydraulic systems
	MEM18055B	Dismantle, replace and assemble engineering components

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Install/replace fluid power systems and controls	1.1. Fluid power control principles and system/circuit diagrams are interpreted and understood. 1.2. System/circuit components are identified and inspected for compliance with specifications. 1.3. Sequential installation is undertaken according to manufacturers' specifications and standard operating procedures.

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ELEMENT	PERFORMANCE CRITERIA
2. Check and adjust fluid power system control sequence and operation	2.1. Controls and system operation is checked against operational specifications using appropriate test equipment and application principles/techniques. 2.2. Adjustments are performed to sequence system to meet/align to operational requirements and specifications. 2.3. Modifications/alterations are recorded and reported in accordance with standard operating procedures. 2.4. Controls and system operation is checked and commissioned to specifications.
3. Fault find fluid power systems control circuit	3.1. System/circuit diagrams and data sheets are interpreted and understood. 3.2. System/circuit components are identified and inspected. 3.3. System/circuit is traced and action of components is diagnosed to identify and localise faults. 3.4. System/circuit parts are tested using appropriate test equipment and application principles. 3.5. System/circuit parts are assessed against operational specifications. 3.6. Fault condition is localised at the component level. 3.7. Faulty condition is evaluated, root cause is analysed and corrective action is planned.
4. Maintain and repair or rectify system control components	4.1. Correct maintenance procedures are applied according to standard operating procedures. 4.2. Repair procedures are selected and applied using correct and appropriate techniques, tools and equipment. 4.3. Faulty items are tested, repaired or replaced using sequential installation procedures according to manufacturers' recommendations. 4.4. Replacement items are selected from manufacturers' catalogues to meet specifications. 4.5. System control components are reassembled using appropriate principles and procedures according to specifications required.
5. Check and adjust sequence of fluid power system controls	5.1. Using circuit diagrams and fluid power system control principles, circuit sensors and controllers are identified. 5.2. Necessary adjustments to sequence system control circuit are made to meet operational specification.

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ELEMENT	PERFORMANCE CRITERIA
	5.3. Correct operation of system control circuit is checked against operational specification. 5.4. Correct operation is confirmed. 5.5. Fluid power system controls are commissioned to specifications. 5.6. Appropriate follow-up procedures are adopted. 5.7. Service/maintenance report is completed to standard operating procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in: • obtaining and interpreting system/circuit diagrams, system operation data sheets and control data • planning and sequencing operations • checking/inspecting system/circuit components for compliance with specifications • undertaking installation of the fluid power system and controls in accordance with manufacturers' specifications and work site procedures • using test equipment to check control and system operation against specification • adjusting the system where appropriate, to ensure that the sequence of operations conforms to operational requirements • recording/reporting any modifications/alterations to the system • checking the operation of the controls and system for conformance to specification • commissioning the system in accordance with work site procedures • identifying and localising components not conforming to operational specification • conducting appropriate maintenance in accordance with work site procedures • repairing control components where appropriate • testing faulty items for conformance to specification • installing repaired/replaced components • selecting replacement items from manufacturers' catalogues • reassembling control components • initiating maintenance and/or service follow-up procedures • completing maintenance and/or service reports

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REQUIRED SKILLS AND KNOWLEDGE
Required knowledge
Look for evidence that confirms knowledge of: • system operational and control requirements and specifications • the application of common fluid power system components and controllers • the system/circuit components • any special installation requirements • fluid power test equipment and application • the correct operational sequence of the system • typical adjustments to correct sequencing variations from specification • the consequences of not recording/reporting modifications to systems • the procedures for recording/reporting modifications/alterations • the fluid power system commissioning procedures • common test equipment and its application • the component(s) not complying with operational specification • typical causes of component failure • the cause of the faulty condition in the component(s) • appropriate procedures for rectifying the faulty condition • the appropriate maintenance schedule and procedures • appropriate control component repair procedures • typical test equipment and its application • circuit sensors and controllers • common adjustments that can be made to control systems and their effect • any maintenance/service follow-up procedures • the maintenance/service recording/reporting requirements • hazards and control measures associated with maintaining and rectifying fluid power controls, including housekeeping • safe work practices and procedures

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must

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EVIDENCE GUIDE	
	be able to maintain fluid power controls. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with maintaining and rectifying fluid power controls or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

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Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Fluid power control principles	PLCs, relay logic control systems, unitised/modular sensors, transducers, timers, counters and associated equipment

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Maintenance and diagnostics

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MEM18055B Dismantle, replace and assemble engineering components

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers dismantling and identifying faulty components, selecting replacements, and assembling engineering components into assemblies or sub-assemblies in accordance with standard operating procedures.

Application of the Unit

Application of the unit	This unit involves dismantling, checking, replacing and assembling engineering components in accordance with standard operating procedures. All specifications are interpreted from manufacturers' manuals, engineering drawings, detailed/technical sketches and associated data sheets. Tasks are undertaken utilising engineering principles, designated procedures, appropriate tools, equipment and safe workshop practices. Work is undertaken autonomously or in a team environment using predetermined standards of quality, safety and workshop procedures. Where fitting techniques and principles are required to assess component condition, and/or modify components to achieve precision fits, unit MEM18006C (Repair and fit engineering components) should also be selected. Where precision mechanical measurement is required, then Unit MEM12003B (Perform precision mechanical measurement) should also be selected. **Band**: **A** **Unit Weight**: **3**

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Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		
Path 1	MEM09002B	Interpret technical drawing
	MEM12023A	Perform engineering measurements
	MEM18001C	Use hand tools
	MEM18002B	Use power tools/hand held operations

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Dismantle engineering	1.1. Engineering components are inspected and task

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ELEMENT	PERFORMANCE CRITERIA
components	requirements are analysed. 1.2. Appropriate tools and equipment are selected and component/s are prepared for dismantling. 1.3. Component is dismantled using standard operating procedures, tools and equipment. 1.4. Engineering components are clearly marked to aid reassembly.
2. Identify faulty components	2.1. Specifications for components are obtained from appropriate source and are interpreted and understood. 2.2. Damaged or faulty components are assessed against specifications according to standard operating procedures. 2.3. Faulty components are identified for repair, replacement or adjustment according to standard operating procedures.
3. Select replacement components	3.1. Where applicable, replacement and/or repaired parts are selected for reassembly according to standard operating procedures.
4. Assemble engineering components into assemblies or sub-assemblies	4.1. Appropriate techniques are applied in the preparation, assembly and adjustment of components using fastening equipment and methods which ensure conformance to specifications, operational performance, quality and safety of the completed assembly according to standard operating procedures. 4.2. Correct lubrication, packing, sealing materials are selected and applied correctly in conformance to job specifications. 4.3. Final component assembly is inspected, tested and adjusted as necessary for compliance with operational specifications and returned to use according to standard operating procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.

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REQUIRED SKILLS AND KNOWLEDGE

Required skills

Look for evidence that confirms skills in:

- obtaining and interpreting all relevant instructions, standard operating procedures, drawings and specifications
- preparing component for dismantling
- dismantling components using appropriate techniques, tools and equipment
- marking component parts appropriately for identification purposes
- checking components visually and dimensionally for conformance to specification
- where appropriate, marking faulty parts for repair, replacement or adjustment
- selecting and confirming replacement parts to specifications
- obtaining and using all relevant supplier catalogues
- preparing and assembling components using appropriate techniques in accordance with standard operating procedures
- where appropriate, applying lubricants correctly to the assembly in accordance with specifications and standard operating procedures
- where appropriate, applying packing and/or sealing materials in accordance with specifications and standard operating procedures
- inspecting and checking the final assembly for conformance to specification
- where appropriate, returning the final assembly to use

Required knowledge

Look for evidence that confirms knowledge of:

- tasks to be performed in accordance with standard operating procedures
- procedures for dismantling the assembly
- tools and equipment to be used to dismantle the components
- procedures and required equipment for checking components for conformance to specification
- specifications of the components to be replaced
- features and/or dimensions upon which replacement parts are to be selected
- process of identifying replacement parts from "third party" suppliers' catalogues
- procedures for assembling components
- requirements of the assembly in terms of specifications, operational performance, quality and safety
- procedures for lubricating the assembly
- materials
- checks to be undertaken during inspection of the final assembly
- procedures for returning components/assemblies into use
- hazards and control measures associated with dismantling, replacing and assembling engineering components, including housekeeping

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REQUIRED SKILLS AND KNOWLEDGE
• safe work practices and procedures

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to dismantle, replace and assemble engineering components. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with dismantling, replacing and assembling engineering components or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not

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EVIDENCE GUIDE	
	require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Engineering components	Includes a range of component parts found in equipment or product assemblies, sub-assemblies, e.g. couplings, universal joints, pumps etc. employing shafts, pre-manufactured bearings and seals, lubricants, fasteners, gaskets etc.
Appropriate tools and equipment	Includes a range of hand and power tools, bearing pullers, special purpose dismantling and assembly tools etc.
Selected	Replacement parts are selected from manufacturers' catalogues, etc.
Appropriate techniques	Are in accordance with standard operating procedures and may include the straightforward removal and replacement of pre-manufactured bearings and seals

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Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Maintenance and diagnostics

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NWP318A Monitor and operate gated spillways

Modification History

NWP318A Release 2: Layout adjusted. No changes to content.

NWP318A Release 1: Primary release.

Unit Descriptor

This unit of competency describes the outcomes required to manage and conduct surveillance of catchment run-off through dams and other water storage assets with gated spillways for dam/storage operations and flood routing.

Application of the Unit

This unit supports the attainment of skills and knowledge required for field and operational staff with a specific responsibility for the operation of dams and other water storage assets with gated spillways.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the range statement. Assessment of performance is to be consistent with the evidence guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Monitor flow and flood routing.	1.1 Monitor catchment behaviour during normal and flood conditions according to organisational procedures and practices. 1.2 Determine outflow using standard flow rate calculations. 1.3 Determine flow control settings.
2 Plan and prepare for dam or storage operation.	2.1 Correctly apply ***guidelines and regulatory requirements for dam or water storage operation*** to operation plans. 2.2 Apply relevant organisational policies, standard operating procedures and incident management plans to dam/water storage operation plans and preparations. 2.3 Conduct inspections according to ***organisational and statutory requirements***.
3 Implement dam / water storage operation plans.	3.1 Apply operation plans according to organisational and statutory requirements. 3.2 Inspect and test ***plant and equipment*** according to manufacturer's guidelines and organisational requirements. 3.3 Test, assess and document safety mechanisms.
4 Regulate flows.	4.1 Regulate ***flow control mechanisms*** to maintain safety of asset and required system supply and flood routing. 4.2 Produce ***data*** relating to system operation and performance according to organisational requirements.

Required Skills and Knowledge

This describes the essential skills and knowledge and their level, required for this unit.

Required skills:

- calculate inflow and outflow rates
- interpret and plot graphs
- operate controls and ancillary equipment according to standard operating procedures
- conduct inspections
- coordinate and/or implement operational activities
- interpret plans, drawings, instructions, standard operating procedures, policies and standards
- use safety equipment and personal protective equipment
- use rescue equipment
- use tools and machinery
- identify hazards

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- give and receive instructions
- communicate with other employees and customers
- collect and process data
- communicate
- use equipment and instruments
- interpret drawings, diagrams and charts
- produce reports
- inspect and operate instruments

Required knowledge:

- properties of stored water
- system hydraulics
- effects of water and catchment conditions on flow expectations
- interrogation of catchment monitoring equipment
- water flow measurement
- operation of flood gates or plant
- control systems
- dam operation principles
- materials science e.g. corrosion, paint coating
- communication systems
- principles of hydraulics
- system layout
- environmental aspects of operation and maintenance
- lock out procedures for mechanical and electrical installations
- control systems
- equipment operation
- relevant utilities and service bodies
- hazardous materials handling
- effects of weather and conditions on bulkwater assets
- safe dam operating procedures
- principles of dam inspection
- risk management techniques
- occupational health and safety
- personal work site safety
- organisational and statutory requirements

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.

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Critical aspects for assessment and evidence required to demonstrate competency in this unit

The candidate should demonstrate the ability to manage and conduct surveillance of catchment run-off through dams and other water storage assets including:

- operating gated spillway in conformance with standard operating procedures
- interpreting technical documentation
- identifying and investigating operational problems
- collecting and analysing technical information
- preparing required reports

Context of and specific resources for assessment

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards, and government regulations

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

Validity and sufficiency of evidence requires that:

- competency will need to be demonstrated over a period of time reflecting the scope of the role and the practical requirements of the workplace
- where the assessment is part of a structured learning experience the evidence collected must relate to a number of performances assessed at different points in time and separated by further learning and practice
- a decision of competence should only be made when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit

Questioning will be undertaken in a manner appropriate to the

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skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. ***Bold italicised*** wording, if used in the Performance Criteria, is detailed below. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs if the candidate, accessibility of the item, and local industry and regional contexts.

Guidelines and regulatory requirements for dam or water storage operation include:	• International Commission on Large Dams
	• Australian National Committee on Large Dams (ANCOLD) guidelines
	• storages may include:
	  • weirs
	  • reservoirs

Organisational and statutory requirements may include:	• Occupational Health and Safety, including the use of personal protective equipment • environmental laws and policies • by-laws and organisational policies • Water Acts • construction and occupational health and safety regulations • public safety and disaster plans • International Commission on Large Dams • Australian National Committee on Large Dams guidelines • state government or state committees • asset management plan
Plant and equipment may include:	• gantry crane operations • two-way radio
Flow control mechanisms may include:	• sand dams • temporary dam structures • diversion of flows • temporary and permanent bulkhead gates
Data may include:	• operation and maintenance manuals • past inspection reports • operation, monitoring and testing records • observation and associated comments and reports • original design plans

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- design modifications
- construction records and reports
- survey information
- maintenance records
- performance data

Unit Sector(s)

Not applicable.

Competency field

Collection and distribution.

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NWP319A Monitor and control dam operations

Modification History

NWP319A Release 2: Layout adjusted. No changes to content.

NWP319A Release 1: Primary release.

Unit Descriptor

This unit of competency describes the outcomes required to prepare for and implement dam operation plans, including inspection and testing of dam safety mechanisms.

Application of the Unit

This unit supports the attainment of skills and knowledge required for field and operational staff with a specific responsibility for the operation of ungated dams.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the range statement. Assessment of performance is to be consistent with the evidence guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and prepare for dam operation.	1.1 Check and apply ***guidelines and regulatory requirements for dam operation*** to operation plans. 1.2 Apply relevant organisational policies, standard operating procedures and incident management to ***dam operation plans and preparations***. 1.3 Undertake ***inspections*** according to ***organisational and statutory requirements***.
2 Implement dam operation plans.	2.1 Follow dam operation plans according to organisational requirements. 2.2 Inspect and test ***plant and equipment*** according to manufacturer's guidelines and organisational requirements. 2.3 Test and record ***dam safety mechanisms***.
3 Compile and process operation reports.	3.1 Collect ***operational data*** from measurement instruments, inspections and team members. 3.2 Collect, process, validate and record operational data and store it according to organisational requirements. 3.3 Evaluate data and record and report structural, material and/or equipment problems. 3.4 Recommend remedial action.

Required Skills and Knowledge

This describes the essential skills and knowledge and their level, required for this unit.

Required skills:

- identify operational problems
- identify access problems
- identify security problems
- conduct inspections
- implement operational activities
- interpret plans, drawings, instructions, standard operating procedures, policies and standards
- use equipment and personal protective equipment
- use rescue equipment
- use relevant tools and machinery
- identify safety hazards
- give and receive instructions
- communicate with other employees and customers

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- collect and process data
- communicate
- inspect and operate relevant equipment and instruments
- produce reports

Required knowledge:

- properties of stored water
- basic dam design principles
- risks to dams -lessons from dam incidents
- dam safety emergency operations
- dam security issues
- dam access issues
- dam operation principles
- basic materials science (corrosion, paint coating)
- communication systems
- basic principles of hydraulics
- system layout
- environmental aspects of operation and maintenance
- lock out procedures for mechanical and electrical installations
- control systems
- equipment operation
- relevant utilities and service bodies
- hazardous materials handling
- effects of weather and conditions on bulkwater assets
- safe dam operating procedures
- principles of dam inspection
- risk management techniques
- occupational health and safety
- personal work site safety
- organisational and statutory requirements

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit	The candidate should demonstrate the ability to prepare for and implement dam operation plans including: • operating dams in compliance with standard operating procedures

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- interpreting technical documentation
- identifying and investigating operational problems
- collecting and analysing technical information
- preparing required reports

Context of and specific resources for assessment

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards, and government regulations

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

Validity and sufficiency of evidence requires that:

- competency will need to be demonstrated over a period of time reflecting the scope of the role and the practical requirements of the workplace
- where the assessment is part of a structured learning experience the evidence collected must relate to a number of performances assessed at different points in time and separated by further learning and practice
- a decision of competence should only be made when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit

Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.

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Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. ***Bold italicised*** wording, if used in the Performance Criteria, is detailed below. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs if the candidate, accessibility of the item, and local industry and regional contexts.

Guidelines and regulatory requirements for dam operation include:	• Australian National Committee on Large Dams (ANCOLD) guidelines
Dam operation plans and preparations may include:	• owner's operations manual • dam safety emergency plans
Inspection procedures may include:	• owner's inspection manuals • operation and maintenance manuals • Safety Evaluation of Existing Dams (SEED) guidelines
Organisational and statutory requirements may include:	• occupational health and safety, including the use of personal protective equipment • environmental laws and policies • by-laws • organisational policies and standards operating procedures • Water Acts • construction and occupational health and safety regulations • public safety and disaster plans • Australian National Committee on Large Dams guidelines • state and local government or state committees • asset management plan
Plant and equipment may include:	• valves • pipes • conduits • electrical & mechanical operating systems • hoists and cranes • baulks • trashracks • trunnions
Dam safety mechanisms may include:	• monitoring equipment and systems, including telemetry
Operational data may include:	• operation and maintenance manuals • past inspection reports • operation, monitoring and testing records • observation and associated comments and reports

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- original design plans
- design modifications
- construction records and reports
- survey information
- maintenance records
- performance data

Unit Sector(s)

Not applicable.

Competency field

Dam safety.

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NWP320B Monitor and implement dam maintenance

Modification History

NWP320B Release 2: Layout adjusted. No changes to content.

NWP320B Release 1: Primary release.

Unit Descriptor

This unit of competency describes the outcomes required to conduct inspections of dams and implement dam maintenance programs, including maintenance of dam safety mechanisms. The ability to interpret technical documentation, investigate and resolve maintenance problems and to collect and analyse technical information are essential to performance.

Application of the Unit

This unit supports the attainment of skills and knowledge required for field and operational staff with a specific responsibility for the maintenance of ungated dams.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the range statement. Assessment of performance is to be consistent with the evidence guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan and prepare for dam maintenance.	1.1 Apply ***guidelines and regulatory requirements for large dam maintenance*** to maintenance plans. 1.2 Apply relevant organisational policies, standard operating procedures and incident management plans to ***dam maintenance plans and preparations***. 1.3 Undertake ***inspection procedures*** according to organisational requirements.
2 Implement dam maintenance plans.	2.1 Apply dam maintenance plans according to ***organisational and statutory requirements***. 2.2 Maintain and repair ***dam assets*** according to manufacturer's guidelines and organisational requirements.
3 Compile maintenance and inspection reports.	3.1 Collect required ***data*** from inspections, measurement instruments and delegated personnel. 3.2 Collate, process, validate, record and store data according to organisational and requirements. 3.3 Evaluate data and record and report structural, material and/or equipment problems. 3.4 Recommend remedial action.

Required Skills and Knowledge

This describes the essential skills and knowledge and their level, required for this unit.

Required skills:

- identify and correct maintenance problems
- identify security maintenance issues
- identify access maintenance issues
- conduct inspections
- coordinate maintenance activities
- interpret plans, drawings, instructions, standard operating procedures, policies and standards
- use safety equipment and personal protective equipment
- use rescue equipment
- use relevant tools and machinery
- identify safety hazards
- give and receive instructions
- communicate with other employees and customers
- carry out maintenance of specified assets

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- propose and justify maintenance activities
- analyse and process data
- interpret diagrams, drawings and charts
- inspect and operate relevant equipment and instruments
- produce reports

Required knowledge:

- dam design principles
- risks to dams
- historic dam information
- potential earthquake effects
- properties of stored water
- dam maintenance principles and practices
- basic materials science (corrosion, paint coating)
- communication systems
- basic principles of hydraulics
- system layout
- environmental aspects of maintenance
- lock out procedures for mechanical and electrical installations
- control systems
- equipment operation
- relevant utilities and service bodies
- hazardous materials handling
- effects of weather and conditions on bulkwater assets
- basic principles of soil mechanics
- basic concrete structure, strengths and deterioration
- basic dam construction procedures
- principles of dam inspection
- dam failure mechanisms
- risk management techniques
- occupational health and safety
- personal work site safety
- risk factors and potential hazards of maintenance of dam assets
- maintenance standard operating procedures
- organisational and statutory requirements

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.

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Critical aspects for assessment and evidence required to demonstrate competency in this unit

The candidate should demonstrate the ability to conduct inspections of dams and implement dam maintenance programs including:

- monitoring and implementing dam maintenance in conformance with standard operating procedures
- interpreting technical documentation
- identifying and investigating maintenance problems
- collecting and evaluating technical information
- preparing required reports

Context of and specific resources for assessment

Access to the workplace and resources including:

- documentation that should normally be available in a water industry organisation
- relevant codes, standards, and government regulations

Where applicable, physical resources should include equipment modified for people with disabilities.

Access must be provided to appropriate learning and/or assessment support when required.

Assessment processes and techniques must be culturally appropriate, and appropriate to the language and literacy capacity of the candidate and the work being performed.

Validity and sufficiency of evidence requires that:

- competency will need to be demonstrated over a period of time reflecting the scope of the role and the practical requirements of the workplace
- where the assessment is part of a structured learning experience the evidence collected must relate to a number of performances assessed at different points in time and separated by further learning and practice
- a decision of competence should only be made when the assessor has complete confidence in the person's competence over time and in various contexts
- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence
- where assessment is for the purpose of recognition (RCC/RPL), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time
- assessment can be through simulated project-based activity and must include evidence relating to each of the elements in this unit

In all cases where practical assessment is used it will be

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combined with targeted questioning to assess the underpinning knowledge. Questioning will be undertaken in a manner appropriate to the skill levels of the operator, any cultural issues that may affect responses to the questions, and reflecting the requirements of the competency and the work being performed.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. ***Bold italicised*** wording, if used in the Performance Criteria, is detailed below. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs if the candidate, accessibility of the item, and local industry and regional contexts.

Guidelines and regulatory requirements for large dam maintenance include:	• Australian National Committee on Large Dams (ANCOLD) guidelines
Dam maintenance plans and preparations may include:	• owner's operation and maintenance manuals • owner's inspection manuals • Safety Evaluation of Existing Dams (SEED) guidelines
Inspection procedures may include:	• owner's inspection manuals • owner's operation and maintenance manuals • Safety Evaluation of Existing Dams (SEED) guidelines
Organisational and statutory requirements may include:	• occupational health and safety, including the use of personal protective equipment • environmental laws and policies • by-laws and organisational policies • Water Acts • construction and occupational health and safety regulations • public safety and disaster plans • Australian National Committee on Large Dams guidelines • state and local government or state regulatory committees • asset management plan.
Dam assets may include:	• earthen walls or embankments • concrete walls and structures • hydraulic structures • electrical equipment • spillways and dissipaters • outlets and intake structures

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- pipes
- conduits
- foundations
- mechanical equipment, for example:
  - gates
  - valves
  - standby equipment
  - baulks
  - bulkheads
  - cranes
  - trashracks
  - reservoir perimeter
  - weirs
- drainage systems (surface and sub-surface)
- access roads
- hoists, ladders and platforms
- tunnels and galleries
- monitoring equipment
- survey monuments and monitoring points

Data may include:

- operation and maintenance manuals
- past inspection reports
- operation, monitoring and testing records
- observation and associated comments and reports
- original design plans
- design modifications
- construction records and reports
- survey information
- maintenance records
- performance data

Unit Sector(s)

Not applicable.

Competency field

Dam safety.

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RIIMPO304B Conduct wheel loader operations

Modification History

Not applicable.

Unit Descriptor

This unit covers the conducting of wheel loader operations in mining and extractive industries. It includes planning and preparing for operations, operating the loader, and carrying out post-operational procedures.

Application of the Unit

Wheel loaders are self-propelled wheeled machines with an integral front-mounted bucket-supporting structure and linkage. It loads or excavates through forward motion of the machine, and lifts, transports and discharges material. This unit is appropriate for those working in mobile plant operator roles, at worksites within:

- Coal mining
- Extractive industries
- Metalliferous mining

Licensing/Regulatory Information

Refer to Unit Descriptor.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Plan and prepare for operations	1.1. Access, interpret and apply ***compliance documentation*** relevant to conducting wheel loader operations 1.2. Obtain, interpret and apply ***work requirements and procedures*** for the satisfactory completion of the allocated job 1.3. Access, interpret and apply ***geological*** and ***survey data*** required to complete the allocated job 1.4. ***Inspect*** and ***prepare work area*** in coordination with others 1.5. Identify, manage and report ***potential hazards and risks*** 1.6. Resolve ***coordination requirements*** with others at the site prior to commencing and during work activities 1.7. Select and wear ***personal protective equipment*** appropriate for work activities
2. Operate the loader	2.1. Carry out ***pre-start***, ***start-up***, ***park-up and shutdown procedures*** 2.2. Select and modify the ***operating technique*** to appropriately meet ***changing work conditions*** 2.3. Conduct, control and monitor operations within the equipment limitations 2.4. Act on or report ***monitoring systems and alarms*** 2.5. Recognise and respond to ***hazardous and emergency situations*** 2.6. Complete work in accordance with the agreed work requirements and within the operating capacity of the allocated equipment
3. Carry out post-operational procedures	3.1. Inspect, fault find and report faults 3.2. Carry out routine ***operator servicing***, ***maintenance and housekeeping tasks*** 3.3. Maintain and process ***records and reports***

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Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Specific skills are required to achieve the performance criteria in this unit, particularly for the application in the various circumstances in which this unit may be applied. This includes the ability to carry out the following as required to conduct wheel loader operations:

- apply legislative, organisation and site requirements and procedures
- apply operational safety requirements
- apply environmental requirements
- apply environmentally sensitive fluids and materials disposal requirements and procedures
- apply chemical and fuel safety measures
- apply hazardous goods handling techniques
- apply manual lifting techniques
- work wearing personal protective equipment
- access, interpret and apply technical information
- interpret plans, reports, maps, specifications
- apply hand-eye coordination
- apply equipment operating techniques
- apply work tasks organising techniques
- work in a team
- apply equipment records maintenance requirements
- apply diagnostic techniques
- use relevant hand tools

Required knowledge

Specific knowledge is required to achieve the performance criteria of this unit, particularly its application in a variety of circumstances in which the unit may be used. This includes knowledge of the following as required to conduct wheel loader operations:

- site risk control procedures
- hazard identification and response procedures
- hazardous substances handling techniques
- site personal protective equipment requirements
- site and equipment health and safety procedures
- site environmental and heritage requirements and constraints
- site quality requirements

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- site communication procedures
- site product characteristics
- site geological and survey data
- site operational procedures
- pre-start, start-up, operating and shutdown procedures and techniques
- machine characteristics, technical capability and limitations
- machine operational procedures
- isolation procedures
- maintenance systems and procedures
- site record keeping requirements

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	The evidence required to demonstrate competency in this unit must be relevant to worksite operations and satisfy all of the requirements of the performance criteria, required skills and knowledge and the range statement of this unit and include evidence of the following: • knowledge of the requirements, procedures and instructions for conducting wheel loader operations • implementation of requirements, procedures and techniques for the safe, effective and efficient completion of wheel loader operations • working with others to undertake and complete wheel loader operations that meet all of the required outcomes • consistent timely completion of wheel loader operations that safely, effectively and efficiently meets the required outcomes
Context of and specific resources for assessment	• This unit must be assessed in the context of the work environment. Where personal safety or environmental damage are limiting factors, assessment may occur in a simulated environment provided it is realistic and sufficiently rigorous to cover all aspects of

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	workplace performance, including task skills, task management skills, contingency management skills and job role environment skills. • The assessment environment should not disadvantage the participant. For example, language, literacy and numeracy demands of assessment should not be greater than those required on the job. • Customisation of assessment and delivery environment to sensitively accommodate cultural diversity. • Aboriginal people and other people from a non English speaking background may have second language issues. • Assessment of this competency requires typical resources normally used in the work environment. Selection and use of resources for particular worksites may differ due to site circumstances. • Where applicable, physical resources should include equipment modified for people with disabilities. • Access must be provided to appropriate learning and/or assessment support when required.

Method of assessment	This unit may be assessed in a holistic way with other units of competency. The assessment strategy for this unit must verify required knowledge and skill and practical application using more than one of the following assessment methods:
	• written and/or oral assessment of the candidate's required knowledge
	• observed, documented and/or first hand testimonial evidence of the candidate's:
	  • implementation of appropriate requirement, procedures and techniques for the safe, effective and efficient achievement of required outcomes
	  • consistently achieving the required outcomes
	• first hand testimonial evidence of the candidate's:
	  • working with others to undertake and complete wheel loader operations

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Guidance information for assessment	Consult the SkillsDMC User Guide for further information on assessment including access and equity issues.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Relevant compliance documentation may include:	• legislative, organisation and site requirements and procedures • manufacturer's guidelines and specifications • Australian standards • codes of practice • Employment and Workplace Relations legislation • Equal Employment Opportunity and Disability Discrimination legislation
Work requirements and procedures may come from briefings, handovers, and work orders and may be written or verbal, formal or informal, depending on the complexity of the process and may include:	• product identification • nature and scope of tasks • achievement targets • operational conditions • obtaining permits required • site layout • out of bounds areas • worksite inspection requirements • lighting conditions • plant or equipment defects • hazards and potential hazards • coordination requirements or issues • contamination control requirements • environmental control requirements • barricade and signage requirements
Geological data may include relevant site-specific information in relation to:	• rock type and characteristics • faults and joints • broken ground • water tables or other water sources

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	• wet and dry areas • degree of compaction
Survey data may include relevant site-specific information in relation to:	• floor heights • bench heights and widths • ramp and floor grades • underground workings and voids

Inspect and prepare work area may include:	• identification of hazards
	• selection and implementation of control measures for the hazards identified
	• safeguarding site and non-site personnel by:
	  • erection of barricades and posting of signs
	  • selection of appropriate equipment to ensure personnel safety and protection
	• determination of appropriate path of movement for loads and equipment/vehicles
	• floor clean up to specified levels and grade requirements
	• selection and implementation of environmental control measures

Potential hazards and risks may include:	• installed services • damaged or defective pressurise hoses and fastenings • abandoned equipment • adjoining pit walls or structures • adverse weather conditions (electrical storms, floods, fires) • chemicals • contaminants • ancillary equipment • fences • holes and pot holes • over-hanging rocks • personnel • unsafe ground • unstable faces • vehicles • powerlines • dust and noise • conveyors • overhead services • stored energy which may include: • engine components

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	• radiators and cooling systems • hydraulic tanks and reservoirs • air tanks and reservoirs • hydraulic hoses • air hoses • tyres • air conditioning components • electrical components • braking systems • centrifugal forces
Coordination requirements may include with:	• other mobile plant operators • processing plant operators • maintenance personnel • water truck operators • service vehicle operators • crane and float operators • contractors • inspectors • supervisors • visitors
Personal protective equipment includes:	• steel-capped boots and hardhat • gloves • dust mask • eye and hearing protection • general protective and reflective clothing
Pre-start and start-up procedure may include:	• external check of the machine • inspection of attachments to ensure security and identify defects • selection, removing and fitting of attachments • checking of fluid levels (windscreen washer tank, hydraulic oil, coolant, grease, water, engine oil, fuel) • carry out lubrication • checking of display instrumentation and gauges (indicators, gauges, laser levels), computer systems • inspection of air filter restriction indicator • inspection and checking of cab (horn, lights, air conditioner) • testing of engine and stop engine lights • testing visual and audio warning devices and lights

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	• checking instruments and control lever • reporting of defects and damage
Park-up and shutdown procedure may include:	• secure equipment as required by site procedures • render attachments safe • clear access ways

Operating techniques may include:	• manoeuvring
	• braking
	• bucket loading
	• single sided loading
	• double sided loading
	• drive by loading
	• load carrying
	• haulage vehicle positioning
	• load discharge
	• building and maintaining stockpiles
	• blending materials
	• attaching, securing, lifting, carrying and placing materials
	• driving machines on to floats
	• towing
	• observing site speed limits
	• working safely around:
	  • overhead powerlines
	  • other machines and personnel
	  • live stockpiles

Changing work conditions may include variations in:	• bulk material grades • height of stockpiles • materials • contamination • haulage units • materials handling facilities • weather conditions • light conditions (including day and night)
Monitoring systems and alarms may include:	• brake air pressure • brake oil temperature • computer indicators • engine oil pressure • fuel filter • parking brake • retarder

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	• service meter • speedometer/odometer • steering filters • tachometer • torque converter • oil temperature • transmission filter • voltmeter • water temperature
Hazardous and emergency situations may include:	• powerlines and other overhead services • dust and noise • face overhangs • lighting strikes (potential tyre explosion) • tyre fires (isolation procedures)
Operator service, **maintenance and housekeeping** tasks are those established and authorised for the site and may include:	• cleaning • authorised servicing and the monitoring • recording and reporting of faults • conduct of authorised minor replacements • provision of assistance to maintenance personnel during maintenance and repair activities
Records and reports may include:	• fuel usage • computer readings • end of shift documentation • supplies logs • work logs stockpile information • quality information • despatch details

Unit Sector(s)

Mobile Plant Operations

Competency field

Refer to Unit Sector(s).

Co-requisite units

Not applicable.

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RIIMPO308B Conduct tracked dozer operations

Modification History

Not applicable.

Unit Descriptor

This unit covers conducting tracked dozer operations in the mining and extractive industries. It includes planning and preparing for operations, operating the dozer, carrying out post-operational procedures.

Application of the Unit

This unit is appropriate for those working in mobile plant operator roles, at worksites within:

- Coal mining
- Extractive industries
- Metalliferous mining

Licensing/Regulatory Information

Refer to Unit Descriptor.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Plan and prepare for operations	1.1. Access, interpret and apply ***compliance documentation*** relevant to conducting tracked dozer operations 1.2. Obtain, interpret and clarify ***work requirements and procedures*** for the satisfactory completion of the allocated job 1.3. Access, interpret and apply ***geological*** and ***survey data*** required to complete the allocated job 1.4. ***Inspect and prepare work area*** in coordination with others 1.5. Identify, manage and report ***potential hazards and risks*** 1.6. Resolve ***coordination requirements*** with others at the site prior to commencing and during work activities 1.7. Select personal protective equipment appropriate for work activities
2. Operate the dozer	2.1. Carry out ***pre-start***, ***start-up***, ***park-up and shutdown procedures*** 2.2. Select and modify the ***operating technique*** to appropriately meet ***changing work conditions*** 2.3. Conduct, control and monitor operations within the equipment limitations 2.4. Connect and tow or push equipment and plant safely and in accordance with the authorised equipment and connection capacity 2.5. Act on or report ***monitoring systems and alarms*** 2.6. Recognise and respond to ***hazardous and emergency situations*** 2.7. Complete work in accordance with the agreed work requirements and within the operating capacity of the allocated equipment
3. Carry out post-operational procedures	3.1. Inspect, fault find and report faults 3.2. Carry out routine ***operator servicing***, ***maintenance and housekeeping tasks***

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	3.3. Maintain and process ***records and reports***

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Specific skills are required to achieve the performance criteria in this unit, particularly for the application in the various circumstances in which this unit may be applied. This includes the ability to carry out the following as required to conduct tracked dozer operations:

- apply legislative, organisation and site requirements and procedures
- apply site safety requirements
- access, interpret and apply technical information
- apply equipment records maintenance procedures
- apply diagnostic techniques
- use relevant hand tools
- apply environmental requirements
- apply procedures for disposal of environmentally sensitive fluids and materials
- apply chemical and fuel safety measures
- work wearing personal protective equipment
- interpret plans, reports, maps, specifications
- apply manual lifting techniques
- organise work tasks
- work in a team

Required knowledge

Specific knowledge is required to achieve the performance criteria of this unit, particularly its application in a variety of circumstances in which the unit may be used. This includes knowledge of the following as required to conduct tracked dozer operations:

- site risk control procedures
- site and equipment health and safety procedures
- site environmental requirements and constraints
- site quality requirements
- site communication procedures
- site product characteristics
- basic site geological and survey data
- site operational procedures
- dozer operational procedures and techniques (including towing and pushing)

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• dozer maintenance systems and procedures • dozer characteristics, technical capability and limitations • hazard identification and response procedures • site record keeping requirements • site personal protective equipment requirements

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	The evidence required to demonstrate competency in this unit must be relevant to worksite operations and satisfy all of the requirements of the performance criteria, required skills and knowledge and the range statement of this unit and include evidence of the following: • knowledge of the requirements, procedures and instructions for conducting tracked dozer operations • implementation of requirements, procedures and techniques for the safe, effective and efficient completion of tracked dozer operations • working with others to undertake and complete tracked dozer operations that meet all of the required outcomes • consistent timely completion of tracked dozer operations that safely, effectively and efficiently meets the required outcomes
Context of and specific resources for assessment	• This unit must be assessed in the context of the work environment. Where personal safety or environmental damage are limiting factors, assessment may occur in a simulated environment provided it is realistic and sufficiently rigorous to cover all aspects of workplace performance, including task skills, task management skills, contingency management skills and job role environment skills. • The assessment environment should not

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	disadvantage the participant. For example, language, literacy and numeracy demands of assessment should not be greater than those required on the job. • Customisation of assessment and delivery environment to sensitively accommodate cultural diversity. • Aboriginal people and other people from a non English speaking background may have second language issues. • Assessment of this competency requires typical resources normally used in the work environment. Selection and use of resources for particular worksites may differ due to site circumstances. • Where applicable, physical resources should include equipment modified for people with disabilities. • Access must be provided to appropriate learning and/or assessment support when required.

Method of assessment	This unit may be assessed in a holistic way with other units of competency. The assessment strategy for this unit must verify required knowledge and skill and practical application using more than one of the following assessment methods:
	• written and/or oral assessment of the candidate's required knowledge
	• observed, documented and/or first hand testimonial evidence of the candidate's:
	  • implementation of appropriate requirement, procedures and techniques for the safe, effective and efficient achievement of required outcomes
	  • consistently achieving the required outcomes
	• first hand testimonial evidence of the candidate's:
	  • working with others to undertake and complete tracked dozer operations

Guidance information for assessment	Consult the SkillsDMC User Guide for further information on assessment including access and equity issues.

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Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Relevant compliance documentation may include:	• legislative, organisation and site requirements and procedures • manufacturer's guidelines and specifications • Australian standards • codes of practice • Employment and Workplace Relations legislation • Equal Employment Opportunity and Disability Discrimination legislation
Work requirements and procedures may come from briefings, handovers, and work orders and may be written or verbal, formal or informal, depending on the complexity of the process and may include:	• material identification • nature and scope of tasks • achievement targets • operational conditions • obtaining permits required • site layout • out of bounds areas • worksite inspection requirements • lighting conditions • plant or equipment defects • hazards and potential hazards • coordination requirements or issues • contamination control requirements • environmental control requirements • barricade and signage requirements
Geological data may include relevant site-specific information in relation to:	• rock type and characteristics • faults and joints • broken ground • water tables or other water sources • wet and dry areas • degree of compaction
Survey data may include relevant site-specific information in relation to:	• floor heights • bench heights and widths • ramp and floor grades

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	• road profile requirements • finished work tolerances • underground workings and voids

Inspect and prepare work area may include:	• identification of hazards
	• selection and implementation of control measures for the hazards identified
	• safeguarding site and non-site personnel by:
	  • erection of barricades and posting of signs
	  • selection of appropriate equipment to ensure personnel safety and protection
	• determination of appropriate path of movement for loads and equipment/vehicles
	• floor clean up to specified levels and grade requirements
	• selection and implementation of environmental control measures

Potential hazards and risks may include:	• installed services
	• damaged or defective pressurised hoses and fastenings
	• abandoned equipment
	• adjoining pit walls or structures
	• adverse weather conditions (electrical storms, floods, fires)
	• chemicals
	• contaminants
	• ancillary equipment
	• fences
	• holes and pot holes
	• over-hanging rocks
	• personnel
	• unsafe ground
	• unstable faces
	• vehicles
	• powerlines
	• dust and noise
	• conveyors
	• overhead services
	• stored energy which may include:
	  • engine components
	  • radiators and cooling systems
	  • hydraulic tanks and reservoirs
	  • air tanks and reservoirs

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	• hydraulic hoses • air hoses • air conditioning components • electrical components • braking systems • centrifugal forces
Coordination requirements may include with:	• other mobile plant operators • processing plant operators • maintenance personnel • water truck operators • service vehicle operators • crane and float operators • contractors • inspectors • supervisors • visitors • use of 2-way radios
Pre-start and start-up procedure may include:	• external check of the machine • inspection of attachments to ensure security and identify defects • selection, removing and fitting of attachments • checking of fluid levels (windscreen washer tank, hydraulic oil, coolant, grease, water, engine oil, fuel) • carry out lubrication • checking of display instrumentation and gauges (indicators, gauges, laser levels), computer systems • inspection of air filter restriction indicator • inspection and checking of cab (horn, lights, air conditioner) • testing of engine and stop engine lights • testing visual and audio warning devices and lights • checking instruments and control lever • reporting of defects and damage
Park-up and shutdown procedure may include:	• secure equipment as required by site procedures • render attachments safe • clear access ways
Operating techniques may	• manoeuvring • blade control and application

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include:	• ripper control and application
	• towing
	• pushing
	• building and maintaining stockpiles
	• attaching, securing, lifting, carrying and placing materials
	• driving machines on to floats
	• observing site speed limits
	• working safely around:
	  • high bench walls
	  • overhead powerlines
	  • other machines and personnel
	  • live stockpiles

Changing work conditions may include variations in:	• bulk material grades • height of stockpiles • height of walls • materials • contamination • materials handling facilities • weather conditions • light conditions (including day and night) • broken ground • degree of compaction • location of water table • slope of working surface • stable ground (compaction) amount of scale • wet and dry • working over old underground workings and voids
Monitoring systems and alarms may include:	• brake air pressure • oil temperature • computer indicators • engine oil pressure • fuel filter • parking brake • braking • service meter • speedometer/odometer • steering filters • tachometer • torque converter

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	• transmission filter • voltmeter • water temperature
Hazardous and emergency situations may include:	• powerlines and other overhead services • dust and noise • face overhangs • live stockpile
Operator service, **maintenance and housekeeping tasks** are those established and authorised for the site and may include:	• cleaning • authorised servicing • monitoring, recording and reporting of faults • conduct of authorised minor replacements • provision of assistance to maintenance personnel during maintenance and repair activities
Records and reports may include:	• fuel usage • computer readings • end of shift documentation • supplies logs • work logs stockpile information • quality information • despatch details

Unit Sector(s)

Mobile Plant Operations

Competency field

Refer to Unit Sector(s).

Co-requisite units

Not applicable.

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RIIMPO309A Conduct wheeled dozer operations

Modification History

Not applicable.

Unit Descriptor

This unit covers conducting wheeled dozer operations in resources and infrastructure industries. It includes: planning and preparing for operations; operating wheeled dozers; and carrying out operator maintenance.

Application of the Unit

This unit is appropriate for those working in mobile plant operator roles, at worksites within:

- Civil construction
- Coal mining
- Extractive industries
- Metalliferous mining

Licensing/Regulatory Information

Refer to Unit Descriptor.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Plan and prepare for operations	1.1. Access, interpret and apply ***compliance documentation*** relevant to wheeled ***dozer operations*** 1.2. Obtain, interpret and clarify/confirm ***work requirements*** in the form of shift briefings, handover details or work orders before proceeding 1.3. Access, interpret and apply ***geological and survey data*** required to complete the allocated work 1.4. Access and apply ***safety information and requirements*** throughout the work
2. Operate wheeled dozer	2.1. Resolve ***coordination*** activities with others at the site prior to commencement of, and during the work activity 2.2. Carry out pre-start, start-up, park-up and shutdown procedures 2.3. Control speed and articulated steering of the wheeled dozer during tramming operations 2.4. Use dozer controls and functions effectively, including manoeuvre, blade and ripper to complete specified tasks 2.5. Carry out towing of equipment and plant safely and in accordance with authorised equipment and/or connection capabilities 2.6. Maintain safe grip, traction and productivity in varied ***operating conditions*** 2.7. Act on or report monitoring systems and alarms 2.8. Recognise and respond to hazardous and emergency situations 2.9. Complete work in accordance with the agreed plan and outcomes and within the operating capabilities of the allocated equipment
3. Carry out operator maintenance	3.1. Carry out dozer inspections and fault-finding 3.2. Carry out authorised routine operational servicing, lubrication and housekeeping tasks

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	3.3. Carry out authorised minor maintenance 3.4. Process records

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Specific skills are required to achieve the performance criteria in this unit, particularly for the application in the various circumstances in which this unit may be applied. This includes the ability to carry out the following as required to conduct wheeled dozer operations:

- apply legislative, manufacturer's, organisation and site requirements and procedures
- access, interpret and apply technical information
- maintain equipment records
- use relevant hand tools
- apply problem solving techniques
- apply basic diagnostic techniques
- apply equipment operating procedure
- apply effective communication techniques

Required knowledge

Specific knowledge is required to achieve the Performance Criteria of this unit, particularly its application in a variety of circumstances in which the unit may be used. This includes knowledge of the following, as required to conduct wheeled dozer operations:

- site and equipment safety requirements
- site operational procedures
- wheeled dozer characteristics, technical capabilities and limitations
- wheeled dozer operational procedures
- wheeled dozer instrumentation and controls
- wheeled dozer maintenance systems and procedures
- basic geological and survey data
- hazard identification and response procedures
- site environmental requirements and constraints related to dozer operations

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Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	The evidence required to demonstrate competency in this unit must be relevant to worksite operations and satisfy all of the requirements of the performance criteria, required skills and knowledge and the range statement of this unit and include evidence of the following: • knowledge of the requirements, procedures and instructions for conducting wheeled dozer operations • implementation of requirements, procedures and techniques for the safe, effective and efficient completion of wheeled dozer operations • working with others to undertake and complete wheeled dozer operations that meet all of the required outcomes • consistent timely completion of wheeled dozer operations that safely, effectively and efficiently meet the required outcomes
Context of and specific resources for assessment	• This unit must be assessed in the context of the work environment. Where personal safety or environmental damage are limiting factors, assessment may occur in a simulated environment provided it is realistic and sufficiently rigorous to cover all aspects of workplace performance, including task skills, task management skills, contingency management skills and job role environment skills. • The assessment environment should not disadvantage the participant. For example, language, literacy and numeracy demands of assessment should not be greater than those required on the job. • Customisation of assessment and delivery environment to sensitively accommodate cultural diversity. • Aboriginal people and other people from a non English speaking background may have second

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	language issues. • Assessment of this competency requires typical resources normally used in the work environment. Selection and use of resources for particular worksites may differ due to site circumstances. • Where applicable, physical resources should include equipment modified for people with disabilities. • Access must be provided to appropriate learning and/or assessment support when required.

Method of assessment	This unit may be assessed in a holistic way with other units of competency. The assessment strategy for this unit must verify required knowledge and skill and practical application using more than one of the following assessment methods:
	• written and/or oral assessment of the candidate's required knowledge
	• observed, documented and/or first hand testimonial evidence of the candidate's:
	  • implementation of appropriate requirement, procedures and techniques for the safe, effective and efficient achievement of required outcomes
	  • consistently achieving the required outcomes
	• first hand testimonial evidence of the candidate's:
	  • working with others to undertake and complete wheeled dozer operations

Guidance information for assessment	Consult the SkillsDMC User Guide for further information on assessment including access and equity issues.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work

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situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Relevant compliance documentation may include:	• legislative, organisation and site requirements and procedures • manufacturer's guidelines and specifications • Australian standards • codes of practice • Employment and workplace relations legislation • Equal Employment Opportunity and Disability Discrimination legislation

Dozer operations/tasks may include:	• ripping
	• pushing and preparing overburden
	• ripping and pushing may include:
	  • working under high walls
	  • working in cable areas
	  • highwall chaining
	• supporting other equipment
	• trimming or cutting
	• inter burden and coal handling
	• bench and pad preparation
	• maintenance and civil works
	• working in dumps which may include:
	  • creation of windrows
	  • dump establishment
	• civil works which may include:
	  • road works
	  • contours
	  • batters
	  • rehabilitation and drainage
	  • final landform and the interpretation of associated survey pegs
	  • sealing tailing dams
	• towing and pushing which may include:
	  • lighting plants
	  • pumps
	  • cable boats
	  • towers
	  • sleds
	  • transformers
	  • other equipment

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Work requirements may include:	• product identification
	• nature and scope of tasks
	• achievement targets
	• operational conditions
	• obtaining permits required
	• site layout
	• out-of-bounds areas
	• worksite inspection requirements
	• lighting conditions
	• plant or equipment defects
	• hazards and potential hazards
	• coordination requirements or issues
	• shift details, including:
	  • the plant identification/allocation
	  • working conditions
	  • defects to equipment

Geological data may include relevant site specific information in relation to:	• material type and characteristics • faults and joints • coal seams • water tables or other water sources
Survey data may include relevant site specific information in relation to:	• floor heights • bench widths • grades • laser levelling • set out • GPS control
Safety information may include:	• legislation and regulations • relevant Australian standards • management systems and plans • OHS policy • code of practice • safe working procedures (or equivalent)
Specific **safety requirements** are to include:	• boarding and disembarkation procedures • operational signal procedures • implement lowering and lifting
Coordination with others may include:	• other earthmoving equipment • water carts or trucks • materials handling equipment • light vehicles • lighting plant • use of 2-way radios

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	• reporting defects either verbally or in writing • hand signal
Operating conditions may include:	• visibility day and night • prevailing winds • wet and slippery conditions • loose materials • fog • dust

Unit Sector(s)

Mobile Plant Operations

Competency field

Refer to Unit Sector(s).

Co-requisite units

Not applicable.

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RIIMPO318B Conduct civil construction skid steer loader operations

Modification History

Not applicable.

Unit Descriptor

This unit covers conducting skid steer loader operations in the civil construction industry. It includes: planning and preparing; conducting machine pre-operational checks; operating skid steer loaders; lifting, carrying and placing materials; selecting, removing and fitting attachments; relocating the skid steer loaders; carrying out machine operator maintenance; and cleaning up.

Application of the Unit

This unit is appropriate for those working in operational roles, at worksites within:

- Civil construction

Licensing/Regulatory Information

Refer to Unit Descriptor.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Plan and prepare	1.1. Access, interpret and apply ***compliance documentation*** relevant to ***skid steer loader tasks*** 1.2. Obtain, confirm and apply ***work instructions*** to the allotted task 1.3. Obtain, confirm and apply ***safety requirements*** to the allotted task 1.4. Obtain, identify and implement signage requirements from the project traffic management plan 1.5. Select plant, ***tools and equipment*** to carry out tasks that are consistent with the requirements of the job, check them for serviceability and rectify or report any faults 1.6. Identify, confirm and apply ***environmental*** protection requirements from the project environmental management plan, to the allotted task
2. Conduct machine pre-operational checks	2.1. Carry out pre-start, start-up, park and shutdown procedures 2.2. Check loader controls and functions, including implements or other attachments, brakes and manoeuvrability for serviceability and rectify or report any faults
3. Operate skid steer loader	3.1. Identify site hazards associated with skid steer loader operations and use safe operating techniques to minimise risk 3.2. Identify and apply operating techniques for skid steer loader to achieve optimum output in accordance with manufacturer's design specifications while achieving specified tolerances 3.3. Operate loader to work instructions
4. Lift, carry and place materials	4.1. Conduct ***communication*** practices associated with transportation and lifting of ***materials*** in accordance with site specific practices and procedures, and confirm between parties 4.2. Select, attach and apply slings and lifting

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	gear in accordance with safe working load requirements as identified in legislation 4.3. Establish weight of load 4.4. Position machinery to ensure stability and locate to effectively shift materials according to job specifications 4.5. Shift load safely and effectively 4.6. Move load in accordance with conventional hand and available signals
5. Select, remove and fit attachments	5.1. Select ***attachment*** for the task 5.2. Remove and fit attachment 5.3. Test attachment to ensure correct fitting and operation as specified 5.4. Use attachment in accordance with recommendations and design limits 5.5. Clean and store removed attachments in designated location
6. Relocate the skid steer loader	6.1. Move skid steer loader safely between worksites, observing relevant codes and traffic management requirements 6.2. Prepare for relocation of skid steer loader
7. Carry out machine operator maintenance	7.1. Safely park, shutdown and prepare machine for ***maintenance*** 7.2. Conduct inspection and fault finding 7.3. Remove and replace defective parts safely and effectively 7.4. Carry out regular programmed maintenance tasks
8. Clean up	8.1. Clear work area and dispose of or recycle materials in accordance with project environmental management plan 8.2. Clean, check, maintain and store plant tools and equipment

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.
Required skills
Specific skills are required to achieve the performance criteria in this unit, particularly

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for the application in the various circumstances in which this unit may be applied. This includes the ability to carry out the following as required to conduct civil construction skid steer loader operations:

- apply legislative, organisation and site requirements and procedures
- apply site and equipment safety requirements
- perform safe working load calculations
- apply skid steer loader operating techniques
- apply processes for interpreting drawings and sketches
- apply operational, maintenance and basic diagnostic procedures
- apply site isolation and traffic control responsibilities and authorities
- apply project quality requirements
- use civil construction terminology
- apply methods of changing machine attachments
- apply safe operating techniques in all terrain
- apply basic earthworks calculations
- apply levelling techniques

Required knowledge

Specific knowledge is required to achieve the performance criteria of this unit, particularly its application in a variety of circumstances in which the unit may be used. This includes knowledge of the following as required to conduct civil construction skid steer loader operations:

- skid steer loader types, characteristics, technical capabilities and limitations
- basic principles of soil technology for civil works
- site and equipment safety requirements
- techniques for calculating safe working loads
- skid steer loader techniques related to essential tasks
- processes for interpreting drawings and sketches
- operational, maintenance and basic diagnostic procedures
- site isolation and traffic control responsibilities and authorities
- materials safety data sheet and materials handling methods
- Project Quality Requirements
- civil construction terminology
- methods of changing machine attachments
- safe operating techniques in all terrain
- basic earthworks calculations
- civil construction activity sequences of road construction, earthworks and drainage
- levelling techniques
- JSAs/Safe work method statement

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Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	

Critical aspects for assessment and evidence required to demonstrate competency in this unit	The evidence required to demonstrate competency in this unit must be relevant to worksite operations and satisfy all of the requirements of the performance criteria, required skills and knowledge and the range statement of this unit and include evidence of the following:
	• knowledge of the requirements, procedures and instructions for conducting civil construction skid steer loader operations
	• implementation of requirements, procedures and techniques for the safe, effective and efficient completion of civil construction skid steer loader operations, including:
	  • in a minimum of two different soil types, and
	  • to include the mandatory tasks of stripping/ spreading topsoil and materials, lifting, loading vehicles, excavations, mixing materials and site clean-up
	• working with others to undertake and complete civil construction skid steer loader operations that meet all of the required outcomes
	• consistent timely completion of civil construction skid steer loader operations that safely, effectively and efficiently meet the required outcomes

Context of and specific resources for assessment	• This unit must be assessed in the context of the work environment. Where personal safety or environmental damage are limiting factors, assessment may occur in a simulated environment provided it is realistic and sufficiently rigorous to cover all aspects of workplace performance, including task skills, task management skills, contingency management skills and job role environment skills. • The assessment environment should not disadvantage the participant. For example,

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	language, literacy and numeracy demands of assessment should not be greater than those required on the job. • Customisation of assessment and delivery environment to sensitively accommodate cultural diversity. • Aboriginal people and other people from a non English speaking background may have second language issues. • Assessment of this competency requires typical resources normally used in the work environment. Selection and use of resources for particular worksites may differ due to site circumstances. • Where applicable, physical resources should include equipment modified for people with disabilities. • Access must be provided to appropriate learning and/or assessment support when required.

Method of assessment	This unit may be assessed in a holistic way with other units of competency. The assessment strategy for this unit must verify required knowledge and skill and practical application using more than one of the following assessment methods:
	• written and/or oral assessment of the candidate's required knowledge
	• observed, documented and/or first hand testimonial evidence of the candidate's:
	  • implementation of appropriate requirement, procedures and techniques for the safe, effective and efficient achievement of required outcomes including:
	  • in a minimum of two different soil types, and
	  • to include the mandatory tasks of stripping/ spreading topsoil and materials, lifting, loading vehicles, excavations, mixing materials and site clean-up
	  • consistently achieving the required outcomes
	• first hand testimonial evidence of the candidate's:
	  • working with others to conduct civil

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	construction skid steer loader operations
Guidance information for assessment	Consult the SkillsDMC User Guide for further information on assessment including access and equity issues.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Relevant compliance documentation may include:	• legislative, organisation and site requirements and procedures • manufacturer's guidelines and specifications • Australian standards • codes of practice • Employment and Workplace Relations legislation • Equal Employment Opportunity and Disability Discrimination legislation
A **skid steer loader** is:	• a self-propelled wheeled machine in which steering is accomplished by skidding or reversing the wheels or tracks on one side of the machine. It has an integral front-mounted bucket-supporting structure and linkage, which loads or excavates through forward motion of the machine, and lifts, transports and discharges material
Skid steer loader may include:	• compacting, truck excavation, lifting and carrying materials, cutting batters and benches, rock breaking and any activities associated with attachments listed
Skid steer loader tasks are to include:	• stripping/spreading topsoil and materials, backfilling, lifting, loading vehicles, excavations, mixing materials and site clean-up
Work instructions may include:	• plans, specifications, quality requirements and operational details • quality requirements may include but not be limited to dimensions, tolerances, standards of

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	work and material standards as detailed in the project drawings, specifications and project documentation to meet client satisfaction
Safety requirements are to be:	• in accordance with state or territory legislation and regulations, organisational safety policies and procedures, and project safety plan
Safety requirements may include:	• protective clothing and equipment, use of tools and equipment, workplace environment and safety, handling of materials, use of fire fighting equipment, use of First Aid equipment, hazard control and hazardous materials and substances • personal protective equipment is to include that prescribed under legislation, regulation and workplace policies and practices • safe operating procedures which are to include but not be limited to recognising and preventing hazards associated with underground and overhead services, other machines, personnel, restricted access barriers, traffic control, working at heights, working in proximity to others, worksite visitors and the public • safe parking practices which is to include but not be limited to ensuring access ways are clear, equipment/ machinery is away from overhangs and refuelling sites, a safe distance from excavations, and secured from unauthorised access or movement • hazards and risks may include but not be limited to uneven/unstable terrain, trees, fires, overhead and underground services, bridges, buildings, excavations, traffic, embankments, cuttings, structures and hazardous materials • emergency procedures related to this unit are to include but may not be limited to emergency shutdown and stopping, extinguishing fires, organisational First Aid requirements and evacuation
Tools and equipment are to include:	• hand tools and maintenance equipment relevant to the particular loader
Environmental requirements are to include:	• organisational/project environmental management plan, waste management, water quality protection, noise, vibration, dust and clean-up management

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Communications practices are to include:	• verbal instructions and fault reporting and may include two-way radio, hand signals, mobile phone, site specific instructions, written instructions or instructions related to job/task • on-site meeting processes may include notification/ scheduling (time, place, purpose), task discussions and local coordination of procedural and operational issues
Materials may include:	• clays, silts, stone, gravel, mud, rock, sand, topsoil, blended materials, organic materials, typical construction site materials/waste and bituminous mixes • rock types may include metamorphic, igneous and sedimentary • construction materials may include pegs, wire, cordage, safety equipment and other support equipments
Attachments may include:	• a front end loader (FEL), multipurpose 4:1 bucket, forklift, dozer blade, backhoe, auger, chain digger, power broom, profiler, tiller/mixer, rotary hoe, hammer, asphalt cutter/saw, concrete cutter/saw
Operator **maintenance** is to include:	• cleaning, authorised servicing and the monitoring, recording and reporting of faults. It may also include the conduct of authorised minor replacements and the provision of assistance to maintenance personnel during maintenance and repair activities

Unit Sector(s)

Mobile Plant Operations

Competency field

Refer to Unit Sector(s).

Co-requisite units

Not applicable.

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RIIMPO319A Conduct backhoe/loader operations

Modification History

Not applicable.

Unit Descriptor

This unit covers the conducting backhoe/loader operations in the civil construction industry. It includes: planning and preparing; conducting machine pre-operational checks; operating backhoe/ loaders; lifting, carrying and placing materials; selecting, removing and fitting attachments; relocating the backhoe/ loaders; carrying out machine operator maintenance; and cleaning up.

Application of the Unit

This unit is appropriate for those working in mobile plant operator roles, at worksites within:

- Civil construction

Licensing/Regulatory Information

Refer to Unit Descriptor.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Plan and prepare	1.1. Access, interpret and apply ***compliance documentation*** relevant to conduct ***backhoe/loader tasks*** 1.2. Obtain, confirm and apply ***work instructions*** to the allotted task 1.3. Obtain, confirm and apply ***safety requirements*** to the allotted task 1.4. Identify, obtain and implement signage requirements from the project traffic management plan 1.5. Select plant, ***tools and equipment*** to carry out tasks that are consistent with the requirements of the job, check them for serviceability and rectify or report any faults 1.6. Identify, confirm and apply ***environmental*** protection requirements from the project environmental management plan, to the allotted task
2. Conduct machine pre-operational checks	2.1. Carry out ***pre-start***, ***start-up***, ***park and shutdown procedures*** 2.2. Check machine controls and functions, including implements or other attachments, brakes and manoeuvrability for serviceability and rectify or report any faults
3. Operate backhoe/ loader	3.1. Identify site hazards associated with backhoe/loader operations and use safe operating techniques to minimise risk 3.2. Identify and apply operating techniques for backhoe/loader to achieve optimum output in accordance with design specifications while achieving specified tolerances 3.3. Operate machine to work instructions
4. Lift, carry and place materials	4.1. Conduct ***communication*** practices associated with transportation and lifting of ***materials*** 4.2. Select and attach slings and lifting gear in accordance with safe working load requirements 4.3. Establish weight of load

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	4.4. Position and locate machinery to ensure stability to effectively shift materials according to job specifications 4.5. Shift load safely and effectively 4.6. Move load in accordance with conventional hand and audible signals
5. Select, remove and fit attachments	5.1. Select ***attachment*** for the task 5.2. Remove and fit attachment 5.3. Test attachment to ensure correct fitting and operation 5.4. Use attachment in accordance with recommendations and design limits 5.5. Clean and store removed attachments in designated location
6. Relocate the backhoe/ loader	6.1. Move backhoe/loader safely between worksites, observing relevant codes and traffic management requirements 6.2. Prepare backhoe/loader for relocation
7. Carry out machine operator maintenance	7.1. Park safely, shutdown and prepare machine for ***maintenance*** 7.2. Conduct inspection and fault finding 7.3. Remove, replace safely and effectively defective parts 7.4. Carry out regular programmed maintenance tasks
8. Clean up	8.1. Clear work area and dispose of or recycle materials in accordance with project environmental management plan 8.2. Clean, check, maintain and store plant, tools and equipment

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.
Required skills
Specific skills are required to achieve the performance criteria in this unit, particularly for the application in the various circumstances in which this unit may be applied. This includes the ability to carry out the following as required to conduct backhoe/loader operations:

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- apply legislative, organisation and site requirements and procedures
- apply site and equipment safety requirements
- apply techniques for calculating safe working loads
- apply backhoe/loader techniques related to essential tasks
- interpret drawings and sketches
- apply operational, maintenance and basic diagnostic procedures
- apply site isolation and traffic control responsibilities and authorities
- interpret materials safety data sheet and materials handling methods
- apply project quality requirements
- use civil construction terminology
- apply methods of changing machine attachments
- apply safe operating techniques in all terrain
- carry out basic earthworks calculations
- apply levelling techniques
- interpret JSA's/Safe work method statement

Required knowledge

Specific knowledge is required to achieve the Performance Criteria of this unit, particularly its application in a variety of circumstances in which the unit may be used. This includes knowledge of the following, as required to conduct backhoe/loader operations:

- backhoe/loader types, characteristics, technical capabilities and limitations
- basic principles of soil technology for civil works
- site and equipment safety requirements
- techniques for calculating safe working loads
- backhoe/loader techniques related to essential tasks
- processes for interpreting drawings and sketches
- operational, maintenance and basic diagnostic procedures
- site isolation and traffic control responsibilities and authorities
- materials safety data sheet and materials handling methods
- project quality requirements
- civil construction terminology
- methods of changing machine attachments
- safe operating techniques in all terrain
- basic earthworks calculations
- civil construction activity sequences of road construction, earthworks and drainage
- levelling techniques
- JSA's/Safe work method statement

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Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	

Critical aspects for assessment and evidence required to demonstrate competency in this unit	The evidence required to demonstrate competency in this unit must be relevant to worksite operations and satisfy all of the requirements of the performance criteria, required skills and knowledge and the range statement of this unit and include evidence of the following:
	• knowledge of the requirements, procedures and instructions for conducting backhoe/loader operations
	• implementation of requirements, procedures and techniques for the safe, effective and efficient completion of backhoe/ loader operations, including:
	  • in a minimum of two different soil types and
	  • to include the mandatory tasks: mixing materials, stripping/spreading topsoils and materials, trench excavation, backfilling, lifting and carrying materials, loading dump trucks, wagons, hoppers, chutes, and cutting/boxing
	• working with others to undertake and complete backhoe/ loader operations that meet all of the required outcomes
	• consistent timely completion of backhoe/loader operations that safely, effectively and efficiently meet the required outcomes

Context of and specific resources for assessment	• This unit must be assessed in the context of the work environment. Where personal safety or environmental damage are limiting factors, assessment may occur in a simulated environment provided it is realistic and sufficiently rigorous to cover all aspects of workplace performance, including task skills, task management skills, contingency management skills and job role environment skills. • The assessment environment should not

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	disadvantage the participant. For example, language, literacy and numeracy demands of assessment should not be greater than those required on the job. • Customisation of assessment and delivery environment to sensitively accommodate cultural diversity. • Aboriginal people and other people from a non English speaking background may have second language issues. • Assessment of this competency requires typical resources normally used in the work environment. Selection and use of resources for particular worksites may differ due to site circumstances. • Where applicable, physical resources should include equipment modified for people with disabilities. • Access must be provided to appropriate learning and/or assessment support when required.

Method of assessment	This unit may be assessed in a holistic way with other units of competency. The assessment strategy for this unit must verify required knowledge and skill and practical application using more than one of the following assessment methods:
	• written and/or oral assessment of the candidate's required knowledge
	• observed, documented and/or first hand testimonial evidence of the candidate's:
	  • implementation of appropriate requirement, procedures and techniques for the safe, effective and efficient achievement of required outcomes, including:
	  • in a minimum of two different soil types and
	  • the mandatory tasks: mixing materials, stripping/spreading topsoils and materials, trench excavation, backfilling, lifting and carrying materials, loading dump trucks, wagons, hoppers, chutes, and cutting/boxing
	  • consistently achieving the required outcomes

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	• first hand testimonial evidence of the candidate's: • working with others to undertake and complete the backhoe/loader operations
Guidance information for assessment	Consult the SkillsDMC User Guide for further information on assessment including access and equity issues.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Relevant compliance documentation may include:	• legislative, organisation and site requirements and procedures • manufacturer's guidelines and specifications • Australian standards • codes of practice • Employment and workplace relations legislation • Equal Employment Opportunity and Disability Discrimination legislation
A **backhoe/loader** is:	• a self-propelled wheeled machine with a main structural support designed to carry both a front-mounted bucket loading mechanism and a rear-mounted backhoe
Backhoe/loader tasks are to include:	• mixing materials, stripping/spreading topsoils and materials, trench excavation, backfilling, lifting and carrying materials, loading dump trucks, wagons, hoppers, chutes and cutting/boxing
Backhoe/loader tasks may include:	• scrub clearing, ripping, compacting, cutting, batters and benches, rock breaking, demolition and any activities associated with the attachments listed
A **skid steer loader** is:	• a self-propelled wheeled machine in which steering is accomplished by skidding or reversing the wheels or tracks on one side of the machine. It has an integral front-mounted

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	bucket-supporting structure and linkage, which loads or excavates through forward motion of the machine, and lifts, transports and discharges material
Skid steer loader may include:	• compacting, truck excavation, lifting and carrying materials, cutting batters and benches, rock breaking and any activities associated with attachments listed
Skid steer loader tasks are to include:	• stripping/ spreading topsoil and materials, backfilling, lifting, loading vehicles, excavations, mixing materials and site clean up
Work instructions may include:	• plans, specifications, quality requirements and operational details • quality requirements may include but not be limited to dimensions, tolerances, standards of work and material standards as detailed in the project drawings, specifications and project documentation to meet client satisfaction
Safety requirements are to be:	• in accordance with State or Territory legislation and regulations, organisational safety policies and procedures, and project safety plan
Safety requirements may include:	• protective clothing and equipment, use of tools and equipment, workplace environment and safety, handling of materials, use of fire fighting equipment, use of First Aid equipment, hazard control and hazardous materials and substances • personal protective equipment is to include that prescribed under legislation, regulation and workplace policies and practices • safe operating procedures which are to include but not be limited to recognising and preventing hazards associated with underground and overhead services, other machines, personnel, restricted access barriers, traffic control, working at heights, working in proximity to others, worksite visitors and the public • safe parking practices which is to include but not be limited to ensuring access ways are clear, equipment/ machinery is away from overhangs and refuelling sites, safe distance from excavations, and secured from unauthorised access or movement

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	• hazards and risks may include but not be limited to uneven/unstable terrain, trees, fires, overhead and underground services, bridges, buildings, excavations, traffic, embankments, cuttings, structures and hazardous materials • emergency procedures related to this unit are to include but may not be limited to emergency shutdown and stopping, extinguishing fires, organisational First Aid requirements and evacuation
Tools and equipment are to include:	• hand tools and maintenance equipment relevant to the particular loader and may include lifting equipment
Environmental requirements are to include:	• organisational/project environmental management plan, waste management, water quality protection, noise, vibration, dust and clean-up management
Communications practices are to include:	• verbal instructions and fault reporting and may include two way radio, hand signals, mobile phone, site specific instructions, written instructions or instructions related to job/task • on site meeting processes may include notification/ scheduling (time, place, purpose), task discussions and local coordination of procedural and operational issues
Materials may include:	• clays, silts, stone, gravel, mud, rock, sand, topsoil, blended materials, organic materials, typical construction site materials/waste and bituminous mixes • rock types may include metamorphic, igneous and sedimentary
Attachments may include:	• extending devices, tilt bucket, buckets, compaction wheel, ripper, plate compactor, rock breaker, auger, broom, mower/slasher, forklift, 4 in 1 bucket and free/rock grab
Operator **maintenance** is to include:	• cleaning, authorised servicing and the monitoring, recording and reporting of faults. It may also include the conduct of authorised minor replacements and the provision of assistance to maintenance personnel during maintenance and repair activities

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Unit Sector(s)

Mobile Plant Operations

Competency field

Refer to Unit Sector(s).

Co-requisite units

Not applicable.

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RIIHAN309A Conduct telescopic materials handler operations

Modification History

Not applicable.

Unit Descriptor

This unit covers conducting telescopic materials handler operations in the resources and infrastructure industries. It includes planning and preparing; conducting machine pre-operational checks; operating the telescopic materials handler; attaching, securing, lifting, carrying and placing materials; selecting, removing and fitting attachments; relocating the telescopic materials handler; carrying out machine operator maintenance; and cleaning up. Licensing, legislative, regulatory and certification requirements that apply to this unit can vary between states, territories, and industry sectors. Relevant information must be sourced prior to application of the unit.

Application of the Unit

This unit is appropriate for those working in an operational role at worksites within:

- Civil construction
- Coal mining
- Drilling
- Extractive industries
- Metalliferous mining

Licensing/Regulatory Information

Refer to Unit Descriptor.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold

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unit of competency.	italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Plan and prepare	1.1. Access, interpret and apply ***compliance documentation*** and ***safety requirements*** relevant to the work activity 1.2. Work instructions, including plans, and operational details are obtained, confirmed and applied to the allotted task 1.3. Signage requirements are identified and obtained from the project traffic management plan and implemented 1.4. Plant, ***tools and equipment*** selected to carry out tasks are consistent with the requirements of the job, and are checked for serviceability and any faults are rectified or reported 1.5. ***Environmental protection requirements*** are identified from the project environmental management plan, and are confirmed and applied
2. Conduct machine pre-operational checks	2.1. Pre-start, start-up, park-up and shutdown procedures are carried out 2.2. Telescopic materials handler controls , brakes, attachments and other implements are checked for manoeuvrability, serviceability and faults are rectified or reported
3. Operate telescopic materials handler	3.1. Site ***hazards*** associated with ***telescopic materials handler*** operations are identified and safe operating techniques are used to minimise risk 3.2. Operating techniques for telescopic materials handler are identified and applied to achieve optimum output while achieving specified tolerances 3.3. Telescopic materials handler is operated to

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	work instructions in accordance with company operating procedures
4. Attach, secure, lift, carry and place materials	4.1. ***Communication*** practices associated with transportation and lifting of materials are conducted and continued between parties 4.2. Weight of load is established 4.3. Slings and lifting gear are selected, attached and used in accordance with ***safe working load requirements*** 4.4. Machinery is positioned ensuring stability and located to effectively shift materials according to job specifications 4.5. Load is shifted safely and effectively 4.6. Load is moved in accordance with conventional hand and audible signals
5. Select, remove and fit attachments	5.1. Attachment is selected for the task 5.2. Attachment is moved and fitted 5.3. Attachment is tested to ensure correct fitting and operation 5.4. Attachment is used in accordance with manufacturer's recommendations and design limits 5.5. Removed attachments are cleaned and stored in designated locations
6. Relocate the telescopic materials handler	6.1. Telescopic materials handler is moved safely between worksites, observing relevant codes and traffic management requirements 6.2. Telescopic materials handler is prepared for relocation in accordance with the manufacturer's specifications
7. Carry out machine operator maintenance	7.1. Telescopic materials handler is ***safely parked***, prepared for maintenance and shut down 7.2. Inspection and fault finding are conducted 7.3. Defective parts are removed and replaced safely and effectively 7.4. Regular programmed ***operator maintenance*** tasks are carried out
8. Clean up	8.1. Work area is cleared and materials disposed of or recycled 8.2. Plant, tools and equipment are cleaned,

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	checked, maintained and stored

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Specific skills are required to achieve the Performance Criteria of this unit, particularly for its application in the various circumstances in which this unit may be used. This includes the ability to carry out the following as required to conduct telescopic materials handler operations:

- apply legislative, organisation and site requirements and procedures for conducting telescopic materials handler operations
- apply operational safety requirements
- access interpret and apply technical information
- calculate volume, weights
- maintain equipment records
- apply fault finding techniques
- comply with environmental requirements
- dispose of environmentally sensitive fluids and materials

Required knowledge

Specific knowledge is required to achieve the Performance Criteria of this unit, particularly for its application in the various circumstances in which this unit may be used. This includes knowledge of the following as required to conduct telescopic materials handler operations:

- telescopic materials handler types, characteristics, technical capabilities and limitations
- site and equipment safety requirements
- techniques for calculating safe working loads
- telescopic materials handler and attachment operating techniques related to essential tasks
- processes for interpreting drawings and sketches
- operational, maintenance and basic diagnostic procedures
- site isolation and traffic control responsibilities and authorities
- materials safety data sheet and materials handling methods
- project quality requirements
- methods of changing machine attachments
- safe operating techniques in all terrain
- basic earthworks calculations

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• levelling techniques • JSA's/safe work method statement

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	The evidence required to demonstrate competency in this unit must be relevant to worksite operations and satisfy all of the requirements of the performance criteria, required skills and knowledge and the range statement of this unit and include evidence of the following: • knowledge of the requirements, procedures and instructions for conducting telescopic materials handler operations • implementation of requirements, procedures and techniques for the safe, effective and efficient conduct of telescopic materials handler operations • working with others to undertake and conduct telescopic materials handler operations that meets all of the required outcomes • consistent timely conduct of materials handler operations that safely, effectively and efficiently meets the required outcomes
Context of and specific resources for assessment	• This unit must be assessed in the context of the work environment. Where personal safety or environmental damage are limiting factors, assessment may occur in a simulated environment provided it is realistic and sufficiently rigorous to cover all aspects of workplace performance, including task skills, task management skills, contingency management skills and job role environment skills. • Assessment of this competency requires typical resources normally used in a resources and infrastructure sector environment. Selection and use of resources for particular worksites

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	may differ due to the site circumstances. • The assessment environment should not disadvantage the participant. For example, language, literacy and numeracy demands of assessment should not be greater than those required on the job. • Customisation of assessment and delivery environment should sensitively accommodate cultural diversity. • Aboriginal people and other people from a non English speaking background may have second language issues. • Where applicable, physical resources should include equipment modified for people with disabilities. Access must be provided to appropriate learning and/or assessment support when required.

Method of assessment	This unit may be assessed in a holistic way with other units of competency. The assessment strategy for this unit must verify required knowledge and skill and practical application using more than one of the following assessment methods:
	• written and/or oral assessment of the candidate's required knowledge
	• observed, documented and/or first hand testimonial evidence of the candidate's:
	  • implementation of appropriate requirement, procedures and techniques for the safe, effective and efficient achievement of required outcomes
	  • consistent achievement of required outcomes
	• first hand testimonial evidence of the candidate's:
	  • working with others to undertake and complete the conduct of telescopic materials handler operations

Guidance information for assessment	Consult the SkillsDMC User Guide for further information on assessment including access and equity issues.

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Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Compliance documentation may include:	• legislative, organisation and site requirements and procedures • manufacturer's guidelines and specifications • Australian standards • environmental requirements including those outlined in organisational/project environmental management plan, waste management, water quality protection, noise, vibration, dust and clean-up management • quality requirements including dimensions, tolerances, standards of work and material standards as detailed in the project drawings, specifications and project documentation to meet client satisfaction • graphical instructions, signage, work schedules/plans/specifications, work bulletins, charts and hand drawings, memos, maps, materials safety data sheet (MSDS) and diagrams or sketches • safe work procedures related to the operation of telescopic materials handlers on construction sites • regulatory/legislative requirements pertaining to telescopic materials handler operations and the environment • instructions issued by authorised organisational or external personnel • Employment and workplace relations legislation • Equal Employment Opportunity and Disability Discrimination legislation
Safety requirements may include:	• State or Territory legislation and regulations, organisational safety policies and procedures, and project safety plan. This may include protective clothing and equipment, use of tools and equipment, workplace environment and safety, handling of materials, use of fire fighting equipment, use of First Aid equipment,

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	hazard control and hazardous materials and substances • personal protective equipment, which is to include that prescribed under legislation, regulation and workplace policies and practices • safe operating procedures, which are to include but not be limited to recognising and preventing hazards associated with underground and overhead services, other machines, personnel, restricted access barriers, traffic control, working at heights, working in proximity to others, worksite visitors and the public • emergency procedures include but may not be limited to emergency shutdown and stopping, extinguishing fires, organisational First Aid requirements and evacuation
Tools and equipment may include:	• tools and equipment are to include hand tools, lifting equipment including chains and slings and maintenance equipment relevant to the telescopic materials handler
Attachments may include:	• various types of buckets, various types of material handling arms (jibs), various types of forklift attachments and carriages and lifting hooks
Hazards may include:	• but not be limited to uneven/unstable terrain, trees, fires, overhead and underground services, bridges, buildings, excavations, traffic, embankments, cuttings, structures and hazardous materials
Telescopic materials handler may include:	• (sometimes referred to as a 'telehandler') is a self-propelled wheeled machine with a hydraulically operated telescopic boom assembly. It is a versatile machine due to its manoeuvring capabilities, reach height and the varying types of attachments that may be fitted generally via the integral quick coupler. On some equipment there may also be outriggers fitted • tasks are to include lifting and carrying materials and may include forklift activities and working with front bucket attachments
Communication may include:	• communications are to include but not be limited to verbal instructions and fault reporting and may include two way radio, hand signals, mobile phone, site specific instructions,

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	written instructions or instructions related to job/task • on site meeting processes may include notification/ scheduling (time, place, purpose), task discussions and local coordination of procedural and operational issues
Safe working load requirements may include:	• equipment load charts are provided for each attachment fitted to telescopic materials handlers. For each attachment utilised correct understanding and use of the applicable load chart is mandatory
Safely parked includes:	• ensuring access ways are clear, equipment/ machinery is away from overhangs and refuelling sites, safe distance from excavations, and secured from unauthorised access or movement
Operator maintenance may include:	• cleaning, authorised servicing and the monitoring, recording and reporting of faults. It may also include the conduct of authorised minor replacements and the provision of assistance to maintenance personnel during maintenance and repair activities

Unit Sector(s)

Load Handling

Competency field

Refer to Unit Sector(s).

Co-requisite units

Not applicable.

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TAEDEL301A Provide work skill instruction

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit describes the performance outcomes, skills and knowledge required to conduct individual and group instruction and demonstrate work skills, using existing learning resources in a safe and comfortable learning environment. The unit covers the skills and knowledge required to determine the success of both the training provided and one's own personal training performance. It emphasises the training as being driven by the work process and context.

Application of the Unit

Application of the unit	This unit supports a wide range of applications across any workplace setting and so can be used by any organisation. Its use is not restricted to training organisations.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

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Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Organise instruction and demonstration	1.1. Gather information about ***learner characteristics*** and learning needs 1.2. Confirm a ***safe learning environment*** 1.3. Gather and check ***instruction and demonstration objectives*** and seek assistance if required 1.4. Access and review relevant ***learning resources*** and ***learning materials*** for suitability and relevance, and seek assistance to interpret the contextual application 1.5. Organise access to necessary equipment or physical resources required for instruction and demonstration 1.6. Notify learners of ***details*** regarding the implementation of the learning program and/or delivery plan
2. Conduct instruction and demonstration	2.1. Use interpersonal skills with learners to establish a safe and comfortable learning environment 2.2. Follow the learning program and/or delivery plan to cover all learning objectives 2.3. Brief learners on any ***OHS procedures*** and requirements prior to and during training 2.4. Use ***delivery techniques*** to structure, pace and enhance learning 2.5. Apply ***coaching*** techniques to assist learning 2.6. Use communication skills to provide information,

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ELEMENT	PERFORMANCE CRITERIA
	instruct learners and demonstrate relevant work skills 2.7. Provide opportunities for practice during instruction and through work activities 2.8. Provide and discuss feedback on learner performance to support learning
3. Check training performance	3.1. Use ***measures*** to ensure learners are acquiring and can use new technical and generic skills and knowledge 3.2. Monitor learner progress and outcomes in consultation with learner 3.3. Review relationship between the trainer/coach and the learner and adjust to suit learner needs
4. Review personal training performance and finalise documentation	4.1. Reflect upon personal performance in providing instruction and demonstration, and document strategies for improvement 4.2. Maintain, store and secure learner records according to organisational and legal requirements

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

- verbaland non-verbal communication techniques, such as:
  - asking relevant and appropriate questions
  - providing explanations
  - demonstrating
  - using listening skills
  - providing information clearly
- safety skills to implement OHS requirements, by acting and responding safely in order to:
  - identify hazards
  - conduct prestart-up checks if required
  - observe and interpret learner behaviour that may put people at risk
- time-management, skills to:

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REQUIRED SKILLS AND KNOWLEDGE

- ensure all learning objectives are covered
- pace learning

- reflection skills in order to:
  - identify areas for improvement
  - maintain personal skill development
- literacy skills to:
  - complete and maintain documentation
  - read and follow learning programs and plans
  - read and analyse learner information
- technology skills to operate audio-visual and technical equipment
- interpersonal skills to:
  - engage, motivate and connect with learners
  - provide constructive feedback
  - maintain appropriate relationships
  - establish trust
  - use appropriate body language
  - maintain humour
  - demonstrate tolerance
  - manage a group
  - recognise and be sensitive to individual difference and diversity
- observation skills to:
  - monitor learner acquisition of new skills, knowledge and competency requirements
  - assess learner communication and skills in interacting with others
  - identify learner concerns
  - recognise learner readiness to take on new skills and tasks

Required knowledge

- learner characteristics and needs
- content and requirements of the relevant learning program and/or delivery plan
- sources and availability of relevant learning resources and learning materials
- content of learning resources and learning materials
- training techniques that enhance learning and when to use them
- introductory knowledge of learning principles and learning styles
- key OHS issues in the learning environment, including:
  - roles and responsibilities of key personnel
  - responsibilities of learners
  - relevant policies and procedures, including hazard identification, risk assessment, reporting requirements, safe use of equipment and emergency

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REQUIRED SKILLS AND KNOWLEDGE
procedures • risk controls for the specific learning environment

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	Assessment must address the scope of this unit and reflect all components of the unit. A range of appropriate assessment methods and evidence-gathering techniques must be used to determine competency. A judgement of competency should only be made when the assessor is confident that the required outcomes of the unit have been achieved and that consistent performance has been demonstrated.

Critical aspects for assessment and evidence required to demonstrate competency in this unit	Evidence of the ability to:
	• carry out aminimum of three training sessions, involving demonstrating and instructing particular work skills for different groups; with each session addressing:
	  • different learning objectives
	  • a range of techniques and effective communication skills appropriate to the audience.

Context of and specific resources for assessment	Evidence must be gathered in the workplace wherever possible. Where no workplace is available, a simulated workplace must be provided.
Method of assessment	
Guidance information for assessment	For further information about assessment of this and other TAE units, refer to relevant implementation guidance published on the IBSA website (www.ibsa.org.au).

Range Statement

RANGE STATEMENT

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RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Learner characteristics may include:	• language, literacy and numeracy levels • learning styles • past learning and work experiences • specific needs • workplace culture.
Safe learning environment may include:	• exit requirements • personal protective equipment • safe access • safe use of equipment.

Instruction and demonstration objectives may include:	• competencies to be achieved
	• generic and technical skills, which may be:
	  • provided by the organisation
	  • developed by a colleague
	  • individual or group objectives
	  • learning outcomes.

Learning resources may include:	• any material used to support learning, such as:
	  • learner and user guides
	  • trainer and facilitator guides
	  • example training programs
	  • specific case studies
	  • professional development materials
	  • assessment materials
	• a variety of formats
	• those produced locally
	• those acquired from other sources.

Learning materials may include:	• handouts for learners • materials sourced from the workplace, e.g. workplace documentation, operating procedures, and specifications.
Details may include:	• location and time • outcomes of instruction or demonstration • reason for instruction or demonstration • who will be attending instruction session.

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RANGE STATEMENT	
OHS procedures may include:	• emergency procedures • hazards and their means of control • incident reporting • use of personal protective equipment • safe work practices • safety briefings • site-specific safety rules.
Delivery techniques may include:	• coaching • demonstration • explanation • group or pair work • providing opportunities to practise skills and solve problems • questions and answers.
Coaching may include:	• learning arrangements requiring immediate interaction and feedback • on-the-job instruction and 'buddy' systems • relationships targeting enhanced performance • short-term learning arrangements • working on a one-to-one basis.
Measures may include:	• informal review or discussion • learner survey • on-the-job observation • review of peer coaching arrangements.

Unit Sector(s)

Unit sector	Delivery and facilitation

Competency field

Competency field	

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Co-requisite units

Co-requisite units		

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TLILIC0012A Licence to operate a vehicle loading crane (capacity 10 metre tonnes and above)

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor	This unit specifies the outcomes required to operate a vehicle loading crane with a capacity of 10 metre tonnes or more, mounted on a vehicle for the principle purpose of loading and unloading such a vehicle, including the application of load estimation and slinging techniques to move a load, for licensing purposes.

Application of the Unit

Application of the Unit	This unit requires the operator to plan the work, conduct routine checks, set up crane, transfer loads and shut down and secure crane. This unit is based on the requirements of the National Standard for Licensing Persons Performing High Risk Work. This unit in its current form meets state and territory licensing requirements. Any alteration will result in a unit which is not acceptable to regulators for the purpose of licensing.

Licensing/Regulatory Information

Refer to Unit Descriptor

Pre-Requisites

Not Applicable

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Employability Skills Information

Employability Skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency	*Performance criteria describe the required performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.*

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Plan work	1.1 Potential workplace ***hazards*** are identified 1.2 ***Hazard control measures*** are identified consistent with ***appropriate standards*** to ensure the safety of personnel and equipment 1.3 The weight of the load is identified and estimated in consultation with ***associated personnel*** (where applicable) 1.4 Suitable lifting points on the load are identified in consultation with ***associated personnel*** 1.5 Appropriate ***lifting equipment*** is obtained following consultation with ***associated personnel*** 1.6 ***Crane*** is ***appropriate*** to the load/s and workplace conditions 1.7 Appropriate paths for the movement of loads in the work area are inspected and determined 1.8 Appropriate ***communication methods*** are identified with ***associated personnel***
2. Conduct routine checks	2.1 ***Crane*** is visually checked for any damage or defects 2.2 All ***signage and labels*** are visible and legible according to the ***appropriate standard***. 2.3 Routine pre-operational crane checks are carried out according to ***procedures***

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ELEMENT	PERFORMANCE CRITERIA
	2.4 All ***controls*** are located and identified 2.5 Crane ***service logbook*** is checked for compliance 2.6 ***Crane*** is started according to ***procedures*** and checked for any abnormal noises 2.7 All crane ***safety devices*** are tested according to ***procedures*** 2.8 Post-start operational checks are carried out according to ***procedures*** 2.9 All ***communication equipment*** is checked for serviceability 2.10 All damage and defects are reported and recorded according to ***procedures***, and appropriate action is taken
3. Set up crane	3.1 ***Ground suitability*** is checked 3.2 ***Crane*** is driven to the work area according to ***procedures*** 3.3 ***Crane*** is positioned for work application and ***stability*** according to ***procedures*** 3.4 Boom/jib and configuration data is input into the crane computer (as required) 3.5 Appropriate ***hazard prevention***/***control measures*** are applied to the work area according to ***procedures*** 3.6 All ***communications equipment*** is tested for functionality 3.7 ***Lifting equipment*** is prepared for load according to ***procedures*** 3.8 ***Load destination*** is prepared
4. Transfer loads	4.1 Loads are determined within the capacity of the crane 4.2 Boom/jib and hoist block is positioned over load following directions from ***associated personnel*** 4.3 ***Lifting equipment*** is attached and secured using ***defined techniques*** according to ***procedures*** 4.4 ***Test lift*** is carried out according to ***procedures*** 4.5 Loads are transferred using all ***relevant crane movements*** according to ***procedures*** and the ***appropriate standard*** 4.6 All required ***communication signals*** are correctly interpreted according to ***procedures*** and the ***appropriate standard***

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ELEMENT	PERFORMANCE CRITERIA
	4.7 The load is landed ensuring stability and security from movement 4.8 ***Lifting equipment*** is removed or disconnected from load and/or lifting hook according to ***procedures*** (where applicable) 4.9 ***Crane*** is operated according to ***procedures*** 4.10 Load movement is monitored constantly ensuring safety to personnel and load, and crane stability 4.11 ***Unplanned and/or unsafe*** situations are responded to in line with ***procedures***
5. Shut down and secure crane	5.1 ***Crane*** boom/jib and equipment are stowed and secured according to ***procedures*** and the ***appropriate standard*** 5.2 Relevant motion locks and brakes are applied (where applicable) 5.3 Outriggers/stabilisers are stowed and secured according to ***procedures*** 5.4 Plates or packing are stowed and secured. 5.5 ***Crane*** is ***shut down*** according to ***procedures*** 5.6 Routine post-operational crane checks are carried out according to ***procedures*** 5.7 ***Lifting equipment*** is stored according to ***procedures*** and the ***appropriate standards*** 5.8 All damage and defects are reported and recorded according to ***procedures***, and appropriate action is taken

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This describes the essential skills and knowledge and their level required for this unit.
Required skills:
• Accurately record and maintain information relating to crane operations • Use communication techniques in the workplace including hand signals, whistles and two-way radios • Use interpersonal communication skills at a level sufficient to communicate with

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REQUIRED SKILLS AND KNOWLEDGE
other site personnel • Operate crane including all functions to their maximum extension in the loading and unloading of loads to the safe working rated capacity of the crane, in conjunction with other associated personnel • Use of lifting equipment and basic slinging techniques suitable for the loads to be loaded/unloaded as defined by workplace procedures • Apply risk assessment and hazard control strategies, including hierarchy of control as applied to the positioning and safe operation of the vehicle loading crane (particular awareness of the risks associated with overhead powerlines/electrical cables, ground conditions and vehicle tipping) • Use and interpret crane manufacturer's specifications and data, including load charts to enable the vehicle loading crane to be configured for the load • Verify problems and equipment faults and demonstrate appropriate response procedures
Required knowledge:
• Appropriate mathematical procedures for estimation of loads • Assessment of ground conditions to confirm that the site is suitable (e.g. firm, level and safe) to operate the crane • Awareness of the boom/jib movements and particularly the safe positioning of the operator for any lift • Commonwealth, state or territory OH&S legislation, standards and codes of practice relevant to the full range of processes for the crane class • Use of lifting equipment and basic slinging techniques suitable for the loads to be loaded/unloaded as defined by workplace procedures • Understanding of the hierarchy of hazard identification and control • Level of literacy to be able to read and comprehend manufacturer's instructions, procedures and safety signs • Organisational and workplace standards, requirements, policies and procedures for conducting operations for the crane class • Procedures for the recording, reporting and maintenance of workplace records and information • Typical routine problems encountered in the process and with equipment and adjustments required for correction • Crane characteristics and capabilities to allow the configuration of the crane to suit the range of loads

Evidence Guide

EVIDENCE GUIDE

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EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, the range statement and the assessment guidelines for the Training Package.	
Overview of assessment	• Successful assessment of this unit meets the competency requirement of the National Standard for Licensing Persons Performing High Risk Work. • State/territory OH&S regulators have mandated the use of Assessment Instruments and Instructions for Assessment for this unit which have been endorsed by the national body responsible for OH&S matters.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	• Compliance with OH&S licensing legislation. • Communicate and work safely with others in the work area. • Assessment of ground conditions to confirm that the site is suitable (e.g. firm, level and safe) to operate the vehicle loading crane. • Risk assessment and hazard control strategies, including hierarchy of control as applied to the positioning and safe operation of the vehicle loading crane (particular awareness of the risks associated with overhead powerlines/electrical cables, ground conditions, wind, pedestrians and tipping). • Set up, position stabilise and operate a vehicle loading crane including all functions to their maximum extension in the loading and unloading of loads to the safe working rated capacity. • Move loads from the vehicle to the ground and/or ground to the vehicle as described in the endorsed assessment tool. • Appropriate mathematical procedures for estimation of loads. • Use of lifting equipment and basic slinging techniques suitable for the loads to be loaded/unloaded as defined in the workplace procedures. • Awareness of the boom/jib movements and particularly the safe positioning of the operator for any lift.
Context of and specific resources for assessment	• Assessment of the safe and effective application of knowledge and skill to workplace tasks (performance) must be undertaken using the endorsed Assessment Instrument. • Assessment of performance must be undertaken

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EVIDENCE GUIDE	

	either in the workplace or in a realistically simulated workplace setting.
	• Assessors must ensure that the assessment in the workplace is organised to ensure that all the required equipment and materials and a suitable working area is made available to suit the assessment and the workplace.
	• Assessment must occur under standard and authorised work practices, safety requirements and environmental constraints.
	• Assessment is to comply with appropriate standard requirements.
	• Applicants must have access to:
	  • Personal Protective Equipment (PPE) for the purpose of the Performance Assessment
	  • appropriate vehicle loading crane (10 metre tonne or more) and associated equipment in safe condition
	  • appropriate lifting gear in safe condition
	  • Suitable loads as specified by the endorsed Assessment Instrument
	  • communication equipment (e.g. two-way radios, whistles, etc.)
	  • other associated personnel to sling and direct the loads.

Method of assessment	• Assessment must be conducted using the endorsed Assessment Instruments. These Instruments provide advice on their application. • The use of '**simulators**' in the assessment of this unit of competency is **not acceptable**. • Assessment may be in conjunction with the assessment of other units of competency. • Assessment methods must confirm consistency and accuracy of performance together with application of underpinning knowledge. • Assessment must confirm a reasonable inference that competency is not only able to be satisfied under the particular circumstance, but is able to be transferred to other circumstances.
Guidance information for assessment	• Further information about endorsed Assessment Instruments may be obtained from state/territory OH&S regulators.

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Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.	
Hazards	May include but not limited to: • ground stability (e.g. ground condition, recently filled trenches, slopes) • overhead hazards (e.g. powerlines, service pipes) • traffic (e.g. pedestrians, vehicles, other plant) • Insufficient lighting • environmental conditions (e.g. wind, lightning, storms, etc.) • positioning of crane operator • other specific hazards (e.g. dangerous materials)
Hazard control measures	Refers to the systematic process of eliminating or reducing the risk to personnel and property through the application of controls It includes the application of the hierarchy of control, the six-step preference of control measures to manage and control risk: 1 elimination 2 substitution 3 isolation 4 engineering control measures 5 using safe work practices 6 personal protective equipment
Appropriate standards	May include but not limited to: • codes of practice • legislation • Australian standards especially AS2550.1 - 2002 (6.5) • manufacturer's specifications • industry standards
Associated personnel	May include but not limited to: • doggers

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RANGE STATEMENT	
	• riggers
Lifting equipment	May include but not be limited to: • chain slings • wire and synthetic slings • shackles • eyebolts
Crane	A crane with a capacity of 10 metre tonnes and above mounted on a vehicle for the principle purpose of loading and unloading such a vehicle
Appropriate	May include but not limited to: • crane capabilities • environmental conditions (e.g. wind, lightning, storms, etc.)
Communication method	May include but not limited to: • verbal and non-verbal language • written instructions • signage • hand signals • listening • questioning to confirm understanding • appropriate worksite protocol
Signage and labels	May include but not limited to: • crane data plates/labels • load charts • crane decals • control labels
Procedures	May include but not limited to: • manufacturer's guidelines (instructions, specifications or checklists) • industry operating procedures • workplace procedures (work instructions, operating procedures, checklists)
Controls	May include but not limited to: • luffing levers • knuckling levers • hoisting and lowering levers

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RANGE STATEMENT	
	• slewing levers including brake • boom extension levers (where fitted)
Service logbook	May include but not limited to: • any logbook • service book • history record system where the service and maintenance history is kept
Crane safety devices	May include but not limited to: • horns/sirens • audible and visual warning devices • lights
Communication equipment	May include but not limited to: • fixed frequency two-way radios • whistles
Ground suitability	May include but not limited to: • rough uneven ground • backfilled ground • soft soils • hard compacted soil • rock • bitumen • concrete
Stability	May include but not limited to: • deploying outriggers • establishing correct size plates or packing • correctly positioning plates or packing
Hazard prevention/control measures	May include but not limited to: • safety tags on electrical switches/isolators • insulated powerlines • safety observer used inside exclusion zone • disconnected power • traffic barricades and controls • pedestrian controls • trench covers • movement of obstructions • personal protective equipment

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RANGE STATEMENT	
	• adequate illumination
Load destination	May include but not limited to: • ground • vehicles
Defined techniques	May include but not limited to: • fixed lifting points • basic reeved slings
Test lift	The load is lifted just clear of the lifting plane to allow for checks to be safely made in consultation with associated personnel to ensure that: • near capacity loads do not overload the crane • loads of unusual shape or weight distribution are correctly slung • load measuring equipment can be used to verify the calculated weight of the load • all equipment is functioning properly • adjustments to the slinging can be made in a safe manner
Relevant crane movements	May include but not limited to: • luffing • slewing • knuckling • telescoping • raise and lower hoist
Communication signals	May include but not limited to: • stop - hand • stop - whistle • hoist up - hand • hoist up - whistle • hoist down - hand • hoist down - whistle • luff boom down - hand • luff boom down - whistle • luff boom up - hand • luff boom up - whistle • telescope out - hand • telescope out - whistle

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RANGE STATEMENT	
	• telescope in - hand • telescope in - whistle
Unplanned and/or unsafe situations	May include but not limited to: • failure/loss of control (e.g. brakes and steering) • failure of equipment (e.g. hydraulic system) • environmental conditions (e.g. wind, lightning, storms, etc.)
Shut down	May include but not limited to: • retracting boom/jib (where applicable) • retracting hoist rope and hook block • folding boom/jib into the transport position • retracting outriggers/stabilisers • idling engine to stabilise temperature • turning off engine (where applicable) • removing key from ignition (where applicable) • locking and securing cabin (where applicable) • securing crane for travel

Unit Sector(s)

Not Applicable

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TLILIC2001A Licence to operate a forklift truck

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor	This unit specifies the outcomes required for the operation of a powered industrial truck equipped with a mast and an elevating load carriage to which is attached a pair of fork arms or other attachment, for licensing purposes. This definition also includes a truck on which the operator is raised with the attachment for order-picking.

Application of the Unit

Application of the Unit	THIS UNIT REQUIRES THE OPERATOR TO BE ABLE PLAN THE WORK, CONDUCT ROUTINE CHECKS ON THE FORKLIFT, SHIFT LOADS IN A SAFE MANNER, AND SHUT DOWN AND SECURE THE EQUIPMENT AFTER THE COMPLETION OF OPERATIONS. This unit is based on the National Standard for Licensing Persons Performing High Risk Work. This unit in its current form meets state and territory licensing requirements. Any alteration will result in a unit which is not acceptable to regulators for the purpose of licensing.

Licensing/Regulatory Information

Refer to Unit Descriptor

Pre-Requisites

Not Applicable

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Employability Skills Information

Employability Skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Not Applicable

Elements and Performance Criteria

ELEMENT *Elements describe the essential outcomes of a unit of competency.*	**PERFORMANCE CRITERIA** *Performance criteria describe the required performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.*
1. Plan work	1.1 Potential workplace ***hazards*** are identified 1.2 ***Hazard control measures*** are identified consistent with ***appropriate standards*** to ensure the safety of personnel and equipment 1.3 Appropriate ***forklift*** truck is selected according to the load and workplace conditions 1.4 Working area is inspected to determine appropriate path of movement for loads and forklift truck 1.5 ***Communication methods*** are identified according to ***procedures***
2. Conduct routine checks	2.1 Forklift is visually checked for any damage or defects 2.2 All ***signage and labels*** are visible and legible according to the ***appropriate standard*** 2.3 All controls are located and identified 2.4 ***Pre-start operational checks*** are carried out according to ***procedures*** 2.5 ***Forklift*** is started according to ***procedures*** and checked for any abnormal noise 2.6 ***Post-start operational checks*** are carried out according to ***procedures*** 2.7 All forklift functions and safety devices are tested to their maximum according to ***procedures***

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	2.8 Defects and damage are reported and recorded according to ***procedures***, and appropriate action is taken
3. Shift load	3.1 The weight of load is assessed to ensure compliance with ***forklift*** truck data plate specifications 3.2 Appropriate ***hazard prevention***/***control measures*** are implemented and communicated with personnel in the work area 3.3 ***Forklift*** is operated at a safe speed and according to ***procedures*** 3.4 Loads are moved and placed to ensure stability of material and avoidance of hazards 3.5 Load movement is monitored constantly ensuring safety to personnel and load, and structural stability 3.6 ***Unplanned and***/***or unsafe situations*** are responded to in line with ***procedures***
4. Shut down and secure forklift truck	4.1 ***Forklift*** truck is parked to avoid hazards 4.2 Forklift is ***shut down*** according to ***procedures*** 4.3 Routine post-operational forklift checks are carried out according to ***procedures*** 4.4 Forklift is secured to prevent unauthorised access/use 4.5 All defects and damage are reported and recorded according to ***procedures***, and appropriate action is taken

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This describes the essential skills and knowledge and their level required for this unit.
Required skills:
• Accurately interpret information relating to conducting forklift truck operations (e.g. procedures) • Safely conduct forklift truck operations including all functions to the maximum height and load capacity • Identify hazards associated with the operation of the forklift truck, assess risks and put into place effective hazard prevention/control measures for those hazards identified • Use communication skills at a level sufficient to communicate with other site personnel (e.g. receive and interpret work instructions, safety information, emergency procedures)

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REQUIRED SKILLS AND KNOWLEDGE
• Drive forklift with load in forward and reverse, maintaining visibility • Verify problems and equipment faults and demonstrate appropriate response procedures
Required knowledge:
• Methodology of determining the weight of a load • Commonwealth, state or territory OH&S legislation, standards relevant to the safe operation for the forklift trucks • Understanding of forklift characteristics and capabilities (including use of load data plates) • Understanding of the hierarchy of hazard identification and control • Organisational and workplace standards, requirements, policies and procedures for conducting operations for the crane class • Procedures for the recording, reporting and maintenance of workplace records and information • Forklift truck operations and safe operating techniques • Typical routine problems encountered in the operation of the crane and equipment and adjustments required for correction

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, the range statement and the assessment guidelines for the Training Package.	
Overview of assessment	• Successful assessment of this unit meets the competency requirement of the National Standard for Licensing Persons Performing High Risk Work. • State/territory OH&S regulators have mandated the use of Assessment Instruments and Instructions for Assessment for this unit which have been endorsed by the national body responsible for OH&S matters.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	• Compliance with OH&S licensing legislation. • Communicate and work safely with others in the work area. • Identify hazards associated with the operation of the forklift truck and put in place effective hazard controls for those hazards identified.

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EVIDENCE GUIDE	
	• Conduct pre-start-up, operational, moving loads and shut down and secure checks of the forklift truck according to procedures. • Operate the forklift truck and move loads safely, including driving and manoeuvring, picking up and placing of loads at various stack heights. • Drive forklift truck with load in forward and reverse, maintaining visibility.

Context of and specific resources for assessment	• Assessment of the safe application of knowledge and skills to workplace tasks (performance) must be undertaken using the endorsed Assessment Instrument.
	• Assessment of performance must be undertaken either in the workplace or in a realistically simulated workplace setting.
	• Assessment must occur under standard and authorised work practices, safety requirements and environmental constraints.
	• Applicants must have access to:
	  • Personal Protective Equipment (PPE) for the purpose of the Performance Assessment
	  • associated equipment appropriate to forklift truck operations
	  • suitable loads as described by the endorsed Assessment Instrument
	  • manufacturers specifications
	  • appropriate forklift truck in a safe condition.

Method of assessment	• Assessment must be conducted using the endorsed Assessment Instrument. These Instruments provide instruction on their application. • The use of '**simulators**' in the assessment of this unit of competency is **not acceptable**. • Assessment may be in conjunction with the assessment of other units of competency. • Assessment methods must confirm consistency and accuracy of performance together with application of underpinning knowledge. • Assessment must confirm a reasonable inference that competency is not only able to be satisfied under the particular circumstance, but is able to be transferred to other circumstances.
Guidance information for	• Further information about endorsed Assessment Instruments may be obtained from state/territory

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EVIDENCE GUIDE	
assessment	OH&S regulators.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.	
Hazards	May include but not limited to: • ground conditions (e.g. condition of pavement, slopes) • overhead hazards (e.g. powerlines, service pipes) • insufficient lighting • traffic (e.g. pedestrians, vehicles, other plant) • weather (e.g. wind, lightning, rain) • forklift instability (e.g. overloading, poor load placement, irregular loads) • other hazards (e.g. dangerous materials)
Hazard control measures	Refers to the systematic process of eliminating or reducing the risk to personnel and property through the application of controls It includes the application of the hierarchy of control, the six-step preference of control measures to manage and control risk: 1 elimination 2 substitution 3 isolation 4 engineering control measures 5 using safe work practices 6 personal protective equipment
Appropriate standards	May include but not limited to: • legislation • Australian standards • manufacturer's specifications • industry standards (where applicable)

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RANGE STATEMENT	
Forklift truck	May include but not be limited to: • counterbalanced • reach trucks • rough terrain • internal combustion petrol, diesel, gas • electric
Communications methods	May include but not limited to: • verbal and non-verbal language • written instructions • signage • hand signals • listening • questioning to confirm understanding • appropriate worksite protocol
Procedures	May include but not limited to: • manufacturer's guidelines (instructions, specifications or checklists) • industry operating procedures • workplace procedures (work instructions, operating procedures, checklists)
Pre-start operational checks	May include but not limited to: • safety devices fitted where appropriate • forklift data plate fitted and interpreted • logbook, handbook or operating manuals available • external visual check including, evidence of damage, leaks, visual evidence of structural weaknesses (including paint separation or stressed welds) is carried out • forklift attachment is checked for security • approved modifications and/or attachments fitted to manufacturer's specifications (e.g. as per forklift or attachment data plate) are identified • checks for adaptations or modifications outside manufacturer's specifications (e.g. not listed on the forklift or attachment data plate) are carried out • maintenance logbook/records checked

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RANGE STATEMENT	
Post-start operational checks	May include checks of the forklift truck and equipment after start-up to ensure: • hazard warning systems (for example lights and horns), are functional • attachment movements and control functions are smooth and comply with operating requirements • steering, transmission and brake functions comply with operating requirements
Hazard prevention/control measures	May include but not limited to: • barricades and traffic control • safety tags on electrical switches/isolators • insulated powerlines • safety observer used inside exclusion zone • disconnected power • pedestrian control (barricades, signs, etc.) • excavation safeguards • movement of obstructions • personal protective equipment • adequate illumination
Unplanned and/or unsafe situations	May include but not limited: • failure/loss of control (e.g. brakes and steering) • failure of equipment (e.g. hydraulic system) • environmental condition
Shut down	May include, but is not limited to: • parking in a suitable location away from dangerous areas • fork arms are correctly positioned (tips down, tilted forward, lowered to ground) • appropriate transmission/gear is selected for parking (relevant to transmission type) • hand/parking brake is applied • engine power is turned off • ignition key is removed (if applicable) • LPG gas cylinder valve is shut off (where fitted) • securing equipment against unauthorised operation • securing the site • ensuring access ways are clear • identifying and segregating defective equipment

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RANGE STATEMENT	
	and reporting to authorised personnel • batteries are connected to the charger (if applicable)

Unit Sector(s)

Not Applicable

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TLILIC2005A Licence to operate a boom-type elevating work platform (boom length 11 metres or more)

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor	This unit specifies the outcomes required to operate a boom-type elevating work platform (boom length 11 metres or more) for licensing purposes, and involves the operation of a telescoping device, hinged device, or articulated device or any combination of these used to support a platform on which personnel, equipment and materials may be elevated to perform work. The 11 metre boom length shall be taken to mean the greater of the following: (a) The vertical distance from the floor of the platform to the surface supporting the elevating work platform with the platform at its maximum height; or (b) The nominal reach, measured horizontally from the centre point of rotation to the outer edge of the platform in its most extended position.

Application of the Unit

Application of the Unit	This unit requires the operator to plan the work, conduct routine checks, set up elevating work platform, operate elevating work platform and shut down and secure elevating work platform. This unit is based on the requirements of the National Standard for Licensing Persons Performing High Risk Work. This unit in its current form meets state and territory licensing requirements. Any alteration will result in a unit which is not acceptable to regulators for the purpose of licensing.

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Licensing/Regulatory Information

Refer to Unit Descriptor

Pre-Requisites

Not Applicable

Employability Skills Information

Employability Skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency	Performance criteria describe the required performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Plan work	1.1 Potential workplace ***hazards*** are identified 1.2 ***Hazard control measures*** are identified consistent with ***appropriate standards*** to ensure the safety of personnel and equipment 1.3 ***Elevating work platform*** is appropriate for the task 1.4 Appropriate ***communication methods*** are identified
2. Conduct routine checks	2.1 ***Service logbook*** for elevating work platform is checked for compliance 2.2 ***Elevating work platform*** is visually checked for any defects or damage according to ***procedures*** 2.3 Routine pre-operational checks are carried out according to ***procedures*** 2.4 ***Safety equipment*** is inspected according to ***procedures***

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ELEMENT	PERFORMANCE CRITERIA
	2.5 ***Elevating work platform*** is accessed in a safe manner 2.6 Fit ***safety equipment*** and secure to platform according to ***procedures*** 2.7 All controls are located and identified 2.8 ***Elevating work platform*** is started according to ***procedures*** 2.9 All ***safety devices*** are identified and tested according to ***procedures*** 2.10 Post-start operational checks are carried out according to ***procedures*** 2.11 All ***communication equipment*** is checked (where applicable) 2.12 All defects and damage are reported and recorded in according to ***procedures***, and appropriate action is taken
3. Set up elevating work platform	3.1 **Ground *suitability*** is inspected and checked 3.2 Elevating work platform is driven to or located at work area according to ***procedures*** (where applicable) 3.3 Elevating work platform is positioned for work application and ***stability*** according to ***procedures*** 3.4 Appropriate ***hazard prevention***/***control measures*** are applied to the work area according to ***procedures*** 3.5 Work gear and tools are stowed and secured
4. Operate elevating work platform	4.1 ***Elevating work platform*** is operated using all ***relevant plant movements*** according to ***procedures*** and the ***appropriate standards*** 4.2 ***Elevating work platform*** is mobiled using ***best mobile practice*** and appropriate ***procedures*** 4.3 Elevated working platform operations are monitored constantly ensuring safety of personnel and stability 4.4 ***Unplanned and/or unsafe situations*** are responded to in line with ***procedures***
5 Shut down and secure elevating work platform	5.1 ***Elevating work platform*** is lowered and stowed according to ***procedures*** 5.2 All relevant motion locks and brakes are applied (where applicable) 5.3 ***Safety equipment*** is disconnected from platform 5.4 Egress from ***elevated work platform*** is conducted according to ***procedures***

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ELEMENT	PERFORMANCE CRITERIA
	5.5 Outriggers/stabilisers are stowed and secured according to ***procedures*** (where applicable) 5.6 Plates or packing are stowed and secured (where applicable) 5.7 Elevating work platform is ***shut down*** according to ***procedures*** 5.8 Routine post-operational checks are carried out according to ***procedures*** 5.9 All defects and damage are reported and recorded according to ***procedures***, and appropriate action is taken

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This describes the essential skills and knowledge and their level required for this unit.
Required skills:
• Accurately record and maintain information relating to elevating work platform operations • Assess ground conditions to confirm that the site is suitable (e.g. firm, level and safe) to extend and travel the elevating work platform • Complete the positioning, stabilising, set up of elevating work platforms, including the use of outriggers/stabilisers and packing • Operate mobile elevating work platform using best mobile practice • Use communication skills at a level sufficient to communicate with other site personnel • Operate and control an elevating work platform including all functions to their maximum extension within the safe working (rated) capacity • Apply risk assessment and hazard control strategies, including hierarchy of control as applied to the positioning and safe operation of the elevating work platform (particular awareness of the risks associated with overhead powerlines/electrical cables, ground conditions, wind, pedestrians and tipping) • Use and interpret manufacturer's specifications and data • Identify problems and equipment faults and where practicable demonstrate appropriate response procedures
Required knowledge:
• Appropriate mathematical procedures for estimation of loads, to ensure that the elevating work platform is not overloaded

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REQUIRED SKILLS AND KNOWLEDGE
• Commonwealth, state or territory OH&S legislation, standards and codes of practice relevant to the full range of processes for conducting elevating work platform operations • Ability to read and comprehend manufacturer's instructions, procedures and safety signs • Understanding of elevating work platform operations and operating techniques • Emergency procedures and safety equipment, including the use of safety harness, energy absorber, lanyard and anchor points • Understanding of organisational and workplace standards, requirements, policies and procedures for conducting elevating work platform operations • Understanding of the hierarchy of hazard identification and control • Procedures for the recording, reporting and maintenance of workplace records and information, including the use of the service logbook • Typical routine problems encountered in the process and with equipment and adjustments required for correction

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	• Successful assessment of this unit meets the competency requirement of the National Standard for Licensing Persons Performing High Risk Work. • State/territory OH&S regulators have mandated the use of Assessment Instruments and Instructions for Assessment for this unit which have been endorsed by the national body responsible for OH&S matters.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	• Compliance with OH&S licensing legislation. • Emergency procedures and safety equipment, including the use of safety harnesses, energy absorbers, lanyard and anchor points. • Assessment of ground conditions to confirm that the site is suitable (e.g. firm, level and safe) to extend and travel the elevating work platform. • Risk assessment and hazard control strategies, including hierarchy of control as applied to the positioning and safe operation of the elevating work

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EVIDENCE GUIDE	
	platform (particular awareness of the risks associated with overhead powerlines/electrical cables, ground conditions, wind, pedestrians and tipping). • Appropriate procedures for estimation of loads, to ensure that the elevating work platform is not overloaded. • Positioning and operation of the elevating work platform to ensure that the safest lift is performed.

Context of and specific resources for assessment	• Assessment of the safe and effective application of knowledge and skill to workplace tasks (performance) must be undertaken using the endorsed Assessment Instrument.
	• Assessment of performance must be undertaken either in the workplace or in a realistically simulated workplace.
	• Assessors must ensure that the assessment in the workplace is organised to ensure that all the required equipment and materials and a suitable working area is made available to suit the assessment and the workplace.
	• Assessment must occur under standard and authorised work practices, safety requirements and environmental constraints.
	• Assessment is to comply with relevant appropriate standard requirements.
	• Applicants must have access to:
	  • Personal Protective Equipment (PPE) for the purpose of the Performance Assessment
	  • appropriate safety equipment in safe condition
	  • appropriate elevated working platform and associated equipment in safe condition
	  • communication equipment (e.g. two-way radios, mobile phones etc.) where applicable.

Method of assessment	• Assessment must be conducted using the endorsed Assessment Instruments. These Instruments provide advice on their application. • The use of '**simulators**' in the assessment of this unit of competency is **not acceptable**. • Assessment may be in conjunction with the assessment of other units of competency. • Assessment methods must confirm consistency and accuracy of performance together with application of underpinning knowledge.

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EVIDENCE GUIDE	
	• Assessment must confirm a reasonable inference that competency is not only able to be satisfied under the particular circumstances, but is able to be transferred to other circumstances.
Guidance information for assessment	• Further information about endorsed Assessment Instruments may be obtained from state/territory OH&S regulators.

Range Statement

RANGE STATEMENT	
*The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. **Bold italicised** wording, if used in the Performance Criteria, is detailed below.*	
Hazards	May include but not limited to: • ground stability (e.g. ground condition, recently filled trenches, slopes) • overhead hazards (e.g. powerlines, service pipes, trees, buildings etc.) • insufficient lighting • traffic (e.g. pedestrians, vehicles, plant) • environmental conditions (e.g. wind, lightning, storms, etc.) • other specific hazards (e.g. tidal areas, chainsaws, pressure washers, dangerous materials)
Hazard control measures	Refers to the systematic process of eliminating or reducing the risk to personnel and property through the application of controls It includes the application of the hierarchy of control - the six-step preference of control measures to manage and control risk: 1. elimination 2. substitution 3. isolation

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RANGE STATEMENT	
	4. engineering control measures 5. using safe work practices 6. personal protective equipment
Appropriate standards	May include but not limited to: • codes of practice • legislation • Australian Standards • manufacturer's specifications • industry standards (where applicable)
Elevating work platform	The operation of a telescoping device, hinged device, or articulated device or any combination of these used to support a platform on which personnel, equipment and materials may be elevated to perform work. Excluded from this definition are platforms of less than 11 metres boom length. The 11 metre boom length shall be taken to mean the greater of the following: (a) The vertical distance from the floor of the platform to the surface supporting the elevating work platform with the platform at its maximum height; or (b) The nominal reach, measured horizontally from the centre point of rotation to the outer edge of the platform in its most extended position
Communication method	May include but not limited to: • verbal and non-verbal language • written instructions • signage • hand signals • listening • questioning to confirm understanding • appropriate worksite protocol
Service logbook	May include but not limited to: • any logbook • service book • history record system where the service and maintenance history is kept
Procedures	May include but not limited to:

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RANGE STATEMENT	
	• manufacturer's guidelines (instructions, specifications, operators manual or checklists) • industry operating procedures • workplace procedures (work instructions, operating procedures, checklists)
Safety equipment	May include but not limited to: • safety harness • energy absorber • lanyard • anchor points
Safety devices	May include but not limited to: • horns/sirens • audible and visual reversing devices • operator restraint devices (platform gate) • lights (where applicable)
Communication equipment	May include but not limited to: • two-way radios • mobile phone
Ground suitability	May include but not limited to: • rough uneven ground • backfilled ground • soft soils • hard compacted soil • rock • bitumen • concrete
Stability	May include but not limited to: • deploying outriggers • establishing correct size plates or packing • correctly positioning plates or packing
Hazard prevention/control measures	May include but not limited to: • safety tags on electrical switches/isolators • insulated powerlines • safety observer used inside exclusion zone • disconnected power • traffic barricades and controls

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RANGE STATEMENT	
	• illumination requirements • pedestrian controls • trench covers • movement of obstructions • personal protective equipment • suitable area for set-up • suitable firm and stable standing
Relevant plant movements	May include but not limited to: • raising boom • lowering boom • slewing • hinging • articulating • telescoping
Best mobile practice	May include but not limited to: • minimum speed • gentle acceleration and braking • minimum boom/jib length • avoiding ground depressions
Unplanned and/or unsafe situations	May include but not be limited to: • loss of power • failure of controls • contact with overhead electrical conductors • damage caused by contact with obstructions • illness of personnel
Shut down	May include but not limited to: • retracting boom/jib (where applicable) • folding boom/jib into the transport position • retracting outriggers/stabilisers • idling engine to stabilise temperature • turning off engine (where applicable) • removing key from ignition (where applicable)

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Unit Sector(s)

Not Applicable

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TLILIC3006A Licence to operate a non-slewing mobile crane (greater than 3 tonnes capacity)

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor	This unit specifies the outcomes required to operate a mobile crane of greater than 3 tonnes capacity that incorporates a boom or jib which includes articulated type mobile cranes and locomotive cranes, but does not include vehicle tow trucks, for licensing purposes.

Application of the Unit

Application of the Unit	This unit requires the operator to plan the work, conduct routine checks, set up crane, transfer loads, mobile loads, and shut down and secure the crane. This unit is based on the requirements of the National Standard for Licensing Persons Performing High Risk Work. This unit in its current form meets state and territory licensing requirements. Any alteration will result in a unit which is not acceptable to regulators for the purpose of licensing.

Licensing/Regulatory Information

Refer to Unit Descriptor

Pre-Requisites

Not Applicable

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Employability Skills Information

Employability Skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Not Applicable

Elements and Performance Criteria

ELEMENT *Elements describe the essential outcomes of a unit of competency.*	**PERFORMANCE CRITERIA** *Performance criteria describe the required performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.*
1. Plan work	1.1 1.1 Potential workplace ***hazards*** are identified 1.2 ***Hazard control measures*** are identified consistent with ***appropriate standards*** to ensure the safety of personnel and equipment 1.3 The weight of the load is identified and estimated in consultation with ***associated personnel*** 1.4 ***Crane*** is ***appropriate*** to the load/s and workplace conditions 1.5 The appropriate path for the movement of loads in the work area is inspected and determined 1.6 Appropriate ***communication methods*** are identified with ***associated personnel***
2. Conduct routine checks	2.1 Crane is visually checked for any damage or defects 2.2 ***Crane*** is accessed in a safe manner 2.3 All ***signage and labels*** are visible and legible according to the ***appropriate standard*** 2.4 Routine pre-operational crane checks are carried out according to ***procedures*** 2.5 All controls are located and identified 2.6 Crane ***service logbook*** is checked for compliance 2.7 Crane is started according to ***procedures*** and checked for any abnormal noises 2.8 All ***crane safety devices*** are tested according to

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	procedures 2.9 Pos-start operational checks are carried out according to ***procedures*** 2.10 All ***communication equipment*** is checked for serviceability 2.11 All damage and defects are reported and recorded according to ***procedures***, and appropriate action is taken
3. Set up crane	3.1 ***Ground suitability*** is checked 3.2 ***Crane*** is driven to the work area according to ***procedures*** 3.3 ***Crane*** is positioned for work application and ***stability*** according to ***procedures*** 3.4 Appropriate ***crane configuration*** for work task is determined according to ***procedures*** (where applicable) 3.5 Boom/jib and counterweight configuration data is input into the crane computer (where applicable) 3.6 Appropriate ***hazard prevention***/***control measures*** are applied to the work area according to ***procedures*** 3.7 All ***communications equipment*** is tested for functionality
4. Transfer load	4.1 Lifts are determined within the capacity of the crane 4.2 Boom/jib and hoist block is positioned over load following directions from ***associated personnel*** 4.3 ***Test lift*** is carried out according to ***procedures*** 4.4 Loads are transferred using all ***relevant crane movements*** according to ***procedures*** and the ***appropriate standard*** 4.5 All required ***communication signals*** are correctly interpreted according to ***procedures*** and the ***appropriate standard*** 4.6 ***Crane*** is operated according to ***procedures*** 4.7 Load movement is monitored constantly ensuring safety to personnel and load, and crane stability 4.8 ***Unplanned and***/***or unsafe*** situations are responded to in line with ***procedures***
5. Mobile load	5.1 Suitability of ***planned route*** is checked for the crane according to ***procedures*** 5.2 ***Crane*** is configured to mobile load according to procedures

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	5.3 Load is moved using ***best mobile practice*** according to the appropriate standard
6 Shut down and secure crane	6.1 ***Crane*** boom/jib and equipment is stowed and secured, where appropriate, according to ***procedures*** and the ***appropriate standard*** 6.2 Relevant motion locks and brakes are applied (where applicable) 6.3 Outriggers/stabilisers are stowed and secured according to ***procedures*** (where applicable) 6.4 Crane is ***shut down*** according to procedures 6.5 Routine post-operational crane checks are carried out according to ***procedures*** 6.6 Plates or packing are stowed and secured (where applicable) 6.7 All damage and defects are recorded and reported according to ***procedures***, and appropriate action is taken

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This describes the essential skills and knowledge and their level, required for this unit.
Required skills:
• Accurately record and maintain information relating to crane operations • Use communication techniques in the workplace including whistles, hand signals and use of two-way radios • Use communication skills at a level sufficient to communicate with other site personnel • Assessment of ground conditions to confirm that the site is suitable (e.g. firm, level and safe) to operate crane • Operate crane including all functions to their maximum extension in the lifting and moving of loads to the safe working rated capacity in conjunction with other associated personnel • Mobile loads using best mobile practice • Apply risk assessment and hazard control strategies, including hierarchy of control as applied to the positioning and safe operation of the crane (particular awareness of the risks associated with overhead powerlines/electrical cables, ground conditions, crane tipping and demolition sites) • Use and interpret crane manufacturer's specifications and data, including load charts

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REQUIRED SKILLS AND KNOWLEDGE
to enable the crane to be configured for the load • Verify problems and equipment faults and demonstrate appropriate response procedures
Required knowledge:
• Appropriate mathematical procedures for estimation and measurement of loads • Commonwealth, state or territory OH&S legislation, standards and codes of practice relevant to the full range of processes for the crane class • Ability to read and comprehend manufacturer's instructions, procedures and safety signs • Understanding of crane characteristics and capabilities (including use of load charts) to allow the configuration of the crane to suit the range of loads • Understanding of the hierarchy of hazard identification and control • Organisational and workplace standards, requirements, policies and procedures for conducting operations for the crane class • Procedures for the recording, reporting and maintenance of workplace records and information • Typical routine problems encountered in the operation of the crane and equipment and adjustments required for correction

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, the range statement and the assessment guidelines for the Training Package.	
Overview of assessment	Successful assessment of this unit meets the competency requirement of the National Standard for Licensing Persons Performing High Risk Work. State/territory OH&S regulators have mandated the use of Assessment Instruments and Instructions for Assessment for this unit which have been endorsed by the national body responsible for OH&S matters.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	• Compliance with OH&S licensing legislation. • Communicate and work safely with others in the work area. • Risk assessment and management procedures (particular awareness of the risks associated with

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EVIDENCE GUIDE	
	overhead powerlines/electrical cables, ground conditions, crane tipping, other vehicles and personnel). • Operation of a non-slewing mobile crane including all functions to their maximum extension in the lifting and moving of loads to the safe working rated capacity of non-slewing mobile cranes (over 3t capacity) in conjunction with other associated personnel. • Appropriate mathematical procedures for estimation of loads.

Context of and specific resources for assessment	• Assessment of the safe and effective application of knowledge and skill to workplace tasks (performance) must be undertaken using the endorsed Assessment Instrument.
	• Assessment of performance must be undertaken either in the workplace or in a realistically simulated workplace setting.
	• Assessors must ensure that the assessment in the workplace is organised to ensure that all the required equipment and materials and a suitable working area is made available to suit the assessment and the workplace.
	• Assessment must occur under standard and authorised work practices, safety requirements and environmental constraints.
	• Assessment is to comply with relevant appropriate standard requirements.
	• Applicants must have access to:
	  • Personal Protective Equipment (PPE) for the purpose of the Performance Assessment
	  • appropriate non-slewing crane (greater than 3 tonnes) and associated equipment in safe condition
	  • suitable loads as specified by endorsed assessment instrument
	  • communication equipment (e.g. two-way radios, whistles, etc.)
	  • other associated personnel to sling and direct the loads.

Method of assessment	• Assessment must be conducted using the endorsed Assessment Instruments. These Instruments provide advice on their application.

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EVIDENCE GUIDE	
	• The use of '**simulators**' in the assessment of this unit of competency is **not acceptable**. • Assessment may be in conjunction with the assessment of other units of competency. • Assessment methods must confirm consistency and accuracy of performance together with application of underpinning knowledge. • Assessment must confirm a reasonable inference that competency is not only able to be satisfied under the particular circumstances, but is able to be transferred to other circumstances.
Guidance information for assessment	• Further information about endorsed Assessment Instruments may be obtained from state/territory OH&S regulators.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.	
Hazards	May include but not limited to: • ground stability (e.g. ground condition, recently filled trenches, slopes) • overhead hazards (e.g. powerlines, service pipes) • insufficient lighting • traffic (e.g. pedestrians, vehicles, other plant) • environmental conditions (e.g. wind, lightning, storms, etc.) • other specific hazards (e.g. dangerous materials)
Hazard control measures	Refers to the systematic process of eliminating or reducing the risk to personnel and property through the application of controls It includes the application of the hierarchy of control, the six-step preference of control measures to manage and control risk: 1 elimination

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RANGE STATEMENT	
	2 substitution 3 isolation 4 engineering control measures 5 using safe work practices 6 personal protective equipment
Appropriate standards	May include but not limited to: • codes of practice • legislation • Australian standards • manufacturer's specifications • industry standards (where applicable)
Associated personnel	May include but not limited to: • doggers • riggers
Appropriate	May include but not limited to: • crane capabilities • environmental conditions (e.g. wind, lightning, storms, etc.)
Crane	May include: • a crane (greater than 3 tonnes capacity) which meets the requirements of AS1418 • articulated type mobile cranes • locomotive cranes Does not include vehicle tow truck operations
Communication method	May include but not limited to: • verbal and non-verbal language • written instructions • signage • hand signals • listening • questioning to confirm understanding • appropriate worksite protocol
Signage and labels	May include but not limited to: • crane data plates/labels • load charts • crane decals

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RANGE STATEMENT	
	• control labels
Procedures	May include but not limited to: • manufacturer's guidelines (instructions, specifications, operators manual or checklists) • industry operating procedures • workplace procedures (work instructions, operating procedures, checklists)
Controls	May include but not limited to: • luffing levers • hoisting and lowering levers • slewing levers including brake • boom extension levers (where fitted)
Service logbook	May include but not limited to: • any logbook • service book • history record system where the service and maintenance history is kept
Crane safety devices	May include but not limited to: • horns/sirens • audible and visual reversing devices • operator restraint devices • lights
Communication equipment	May include but not limited to: • fixed channel two-way radios • whistles • bells • buzzers NB: where radio communication equipment is used the transmitting frequencies of the equipment must be selected to prevent interference to or from other radio equipment being used in the vicinity of the crane
Ground suitability	May include but not limited to: • rough uneven ground • backfilled ground • soft soils • hard compacted soil

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RANGE STATEMENT	
	• rock • bitumen • concrete
Stability	May include but not limited to: • deploying outriggers • establishing correct size plates or packing • correctly positioning plates or packing
Crane configuration	May include but not be limited to: • boom/jib • fly-jib • counterweights
Hazard prevention/control measures	May include but not limited to: • safety tags on electrical switches/isolators • insulated powerlines • safety observer used inside exclusion zone • disconnected power • traffic barricades and control/s • pedestrian controls • trench covers • movement of obstructions • personal protective equipment • adequate illumination
Test lift	The load is lifted just clear of the lifting plane to allow for checks to be safely made in consultation with associated personnel to ensure that: • near capacity loads do not overload the crane • loads of unusual shape or weight distribution are correctly slung • load measuring equipment can be used to verify the calculated weight of the load • all crane equipment is functioning properly • adjustments to the slinging can be made in a safe manner
Relevant crane movements	May include but not limited to: • telescope in and out • boom/jib up and down • articulating (as applicable)

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RANGE STATEMENT	
	• raise and lower hoist (as applicable)
Communication signals	May include but not limited to: • stop - hand • stop - whistle • hoist up - hand • hoist up - whistle • hoist down - hand • hoist down - whistle • luff boom down - hand • luff boom down - whistle • luff boom up - hand • luff boom up - whistle • telescope out - hand • telescope out - whistle • telescope in - hand • telescope in - whistle • slew/articulate right - hand • slew/articulate right - whistle • slew/articulate left - hand • slew/articulate left - whistle
Unplanned and/or unsafe situations	May include but not limited to: • failure/loss of control (e.g. brakes and steering) • failure of equipment (e.g. hydraulic system) • environmental conditions (e.g. wind, lightning, storms, etc.)
Planned route	May include but not limited to: • unusual or difficult terrains • obstacles or obstruction
Best mobile practice	May include but not limited to: • minimum speed • gentle acceleration and braking (to minimise load swing) • minimum boom/jib length • carrying the load near to the ground surface • use of handheld taglines
Shut down	May include but not limited to: • retracting boom/jib/fly (where applicable)

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RANGE STATEMENT	
	• retracting hoist rope and hook block • idling engine to stabilise temperature • retracting outriggers/stabilisers (where applicable) • turning off engine

Unit Sector(s)

Not Applicable

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UEENEEC001B Maintain documentation

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit covers the maintenance of the variety of documentation required to record work activities, purchases and expenses and compliance obligations. It encompasses documentation typically required in an electrotechnology enterprise, work instructions and procedures and time management.

Application of the Unit

Application of the Unit **2)**

This unit is intended for competency development entry-level employment-based programs incorporated in approved contracts of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to occupational health and safety and where applicable contracts of training such as apprenticeships.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

There are no prerequisite competencies for this unit.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve competency in this unit if they have reading, writing and numeracy skills indicated by the following scales. Description of each scale is given in Volume 2, Part 3 'Literacy and Numeracy'

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a unit of competency	Performance criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA

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ELEMENT	PERFORMANCE CRITERIA
1 Prepare to maintain documentation	1.1 Documentation requirements and methods for the organisation/enterprise are identified, obtained and understood
	1.2 Advice is sought from the work supervisor, when necessary, to ensure the work is correctly documented and coordinate d effectively with others
	1.3 Forms required to document work are obtained in accordance with established routines and procedures
	1.4 OHS risk assessment and control measures are documented before work is commenced in accordance with established routine/procedures.
2 Maintain documentation.	2.1 Activities are documented promptly and at the appropriate time in accordance with established routine/procedures
	2.2 Documentation is checked for accuracy and clarity and any anomalies corrected
	2.3 Where applicable, signature is obtained from an appropriate person and the person's identification documented
	2.4 Where applicable, a copy of any required documentation is forwarded to an appropriate person in accordance with established routine/procedures
	2.5 Procedures for referring non-routine events to immediate supervisor for directions are followed

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence must show that knowledge has been acquired of safe working practices and

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REQUIRED SKILLS AND KNOWLEDGE

maintaining documentation.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

KS01-EC001B Maintaining documentation

Evidence shall show an understanding of maintaining documentation to an extent indicated by the following aspects:

T1. Enterprise communication methods encompassing:

- Communicating with personnel encompassing:
  - Oral communications
  - Written procedures and work instructions
- Communicating with suppliers
- Communicating with customers

T2. Work activities records encompassing:

- Purpose and extent of maintaining work activities records in an enterprise
- Types of records for maintaining work activities in an enterprise
- Methods for recording and maintaining work records
- Work records required by regulation requirements

T3. Using basic computers and applications encompassing:

- Starting up
- Selecting application
- Entering information
- Saving
- Printing

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the unit. It must be read in conjunction with the performance criteria and the range statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this unit. It must be used in conjunction with all parts of this unit and performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment	**9.1)** Longitudinal competency development approaches to

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EVIDENCE GUIDE

assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the industry-preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accordance with industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Sources of evidence need to be 'rich' in nature to minimise error in judgment.

Activities associated with normal everyday work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all prerequisites must be met.

Evidence for competence in this unit shall be considered holistically. Each Element and associated performance criteria shall be demonstrated on at least two occasions in accordance with the 'Assessment Guidelines - UEE07'. Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this

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EVIDENCE GUIDE

shall incorporate evidence that shows a candidate is able to:

- Implement Occupational Health and Safety workplace procedures and practices, including the use of risk control measures as specified in the performance criteria and range statement
- Apply sustainable energy principles and practices as specified in the performance criteria and range statement
- Demonstrate an understanding of the essential knowledge and associated skills as described in this unit. It may be required by some jurisdictions that RTOs provide a percentile graded result for the purpose of regulatory or licensing requirements.
- Demonstrate an appropriate level of skills enabling employment
- Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures

- Demonstrated consistent performance across a representative range of contexts from the prescribed items below:
  - Maintain documentation in any electrotechnology enterprise information system, including:

    A Following enterprise documentation requirements.

    B Enabling documentation to communicate clearly to others.

    C Dealing with unplanned events by drawing on essential knowledge and skills to provide appropriate solutions incorporated in a holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed in this unit.

These should be used in the formal learning/assessment environment.

Note:

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Where simulation is considered a suitable strategy for assessment it must ensure that the conditions for assessment are authentic and as far as possible reproduce and replicate the workplace and is consistent with the approved industry simulation policy.

The resources used for assessment should reflect current industry practices in relation to maintaining documentation.

Method of assessment

9.4)

This unit shall be assessed by methods given in Volume 1, Part 3 'Assessment Guidelines'.

Note:
Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

For optimisation of training and assessment effort, competence in this unit may be assessed concurrently with any unit or units that require formal documentation.

Range Statement

RANGE STATEMENT

10) This relates to the unit as a whole providing the range of contexts and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

This unit must be demonstrated by maintaining documentation in any electrotechnology enterprise information system.

Generic terms used throughout this Vocational Standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms that apply are given in Volume 2, Part 2.1.

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Unit Sector(s)

Not Applicable

Competency Field

Competency Field **11)**

Commercial

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UEENEEC005B Estimate electrotechnology projects

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor

1) Scope:

1.1) Descriptor

This unit covers estimate material and labour costs for competitive quotation/tenders for work exceeding $20k. It encompasses reading and understanding job specifications, material take-offs, determining labour and site requirements, costing and documenting.

Application of the Unit

Application of the Unit

2)

This unit is suitable for competency development employment-based programs incorporated in approved contracts of training. It applies to any formal recognition for this standard at the aligned AQF 5 level or higher.

Licensing/Regulatory Information

License to practice

3)

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to occupational health and safety and where applicable contracts of training such as apprenticeships.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

There are no prerequisite competencies for this unit.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve competency in this unit if they have reading, writing and numeracy skills indicated by the following scales. Description of each scale is given in Volume 2, Part 3 'Literacy and Numeracy'

Reading 5 Writing 5 Numeracy 5

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a unit of competency

Performance criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Ascertain the extent	1.1 OHS procedures for a given work area are

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ELEMENT	PERFORMANCE CRITERIA	
of the project.		identified, obtained and understood.
	1.2	Established OHS risk control measures and procedures are followed.
	1.3	The extent of the project is established from design brief, specification and/or other relevant documentation and from discussions with appropriate person(s).
	1.4	A date by which the estimate is to be completed is determined from design brief, specification and/or other relevant documentation and from discussions with appropriate person(s).
	1.5	Activities are planned to meet scheduled timeframe in consultation with others involved in the work.
2 Estimate project.	2.1	Material take-offs are performed accurately and checked against job specifications.
	2.2	Materials, labour and other costs are determined from industry standard labour rates, enterprise costing arrangements and /or material suppliers.
	2.3	Sources and availability of materials and human resources needed for the project are established in accordance with organisation policies and procedures.
	2.4	Estimates are checked and revised where necessary, for accuracy in costing and against job specification, in consultation with appropriate person(s).
	2.5	Solutions to unplanned events are implemented consistent with enterprise policy.
3 Document and submit quotation.	3.1	Project estimates are documented in accordance with established policies and procedures.
	3.2	Quotation is forwarded to appropriate person(s) for inclusion in a submission within the specified timeframe.
	3.3	Quotation documentation is filed in accordance

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ELEMENT	PERFORMANCE CRITERIA
	with established policies and procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence must show that knowledge has been acquired of safe working practices and estimating electrotechnology projects.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

KS01-EC005B Electrotechnology projects estimation

Evidence shall show an understanding of estimating electrotechnology projects to an extent indicated by the following aspects:

T1. Estimating electrotechnology projects encompassing:

- Documents used in estimating
- Resources to be quantified and costed
- Material take-off methods
- Costing:
  - resource (labour, plant, equipment and materials)
  - contingency
  - money
  - margins
- Labour rates method of costing
- Life cycle costing analysis
- Documenting estimations and costing.
- Evaluating estimates and costs

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the unit. It must be read in conjunction with the performance criteria and the range statement of the unit and the

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EVIDENCE GUIDE

Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this unit. It must be used in conjunction with all parts of this unit and performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

9.1)

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the industry-preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accordance with industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Sources of evidence need to be 'rich' in nature to minimise error in judgment.

Activities associated with normal everyday work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all prerequisites must be met.

Evidence for competence in this unit shall be considered

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EVIDENCE GUIDE

holistically. Each Element and associated performance criteria shall be demonstrated on at least two occasions in accordance with the 'Assessment Guidelines - UEE07'. Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices, including the use of risk control measures as specified in the performance criteria and range statement
  - Apply sustainable energy principles and practices as specified in the performance criteria and range statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in this unit. It may be required by some jurisdictions that RTOs provide a percentile graded result for the purpose of regulatory or licensing requirements.
  - Demonstrate an appropriate level of skills enabling employment
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated consistent performance across a representative range of contexts from the prescribed items below:
  - Estimate electrotechnology projects as described in 8) including:
    - A Ascertaining the extent of the project accurately.
    - B Planning estimation work effectively.
    - C Estimating the job competitively.
    - D Checking the estimates accurately.
    - E Documenting the estimates clearly.
    - F Dealing with unplanned events by drawing on essential knowledge and skills to provide appropriate solutions incorporated in a holistic assessment with the above listed items

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EVIDENCE GUIDE

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed in this unit.

These should be used in the formal learning/assessment environment.

Note:

Where simulation is considered a suitable strategy for assessment it must ensure that the conditions for assessment are authentic and as far as possible reproduce and replicate the workplace and is consistent with the approved industry simulation policy.

The resources used for assessment should reflect current industry practices in relation to estimating electrotechnology projects.

Method of assessment

9.4)

This unit shall be assessed by methods given in Volume 1, Part 3 'Assessment Guidelines'.

Note:
Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

Granting competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:

UEENEED001B	Use basic computer applications relevant to a workplace

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Range Statement

RANGE STATEMENT

10) This relates to the unit as a whole providing the range of contexts and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

This unit must be demonstrated in relation to estimating at least two electrotechnology projects for a competitive quotation/tender. The value of the jobs shall exceeding $20k and may apply to any of the following electrotechnology disciplines.

- Automation technologies ·
- Computers
- Data Communications
- Electrical
- Electrical Machines
- Electronics
- Fire Protection
- Instrumentation
- Refrigeration and Air Conditioning
- Renewable/sustainable energy, and
- Security technology

Generic terms used throughout this Vocational Standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms that apply are given in Volume 2, Part 2.1.

Unit Sector(s)

Not Applicable

Competency Field

Competency Field **11)**

Commercial

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UEENEEC010B Deliver a service to customers

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit covers the interacting with customers to identify and meet their service needs. It encompasses following community and enterprise policies and standards, identifying customer needs, identifying and resolving problems/issues and maintaining product/service quality.

Application of the Unit

Application of the Unit **2)**

This unit is intended for competency development entry-level employment-based programs incorporated in approved contracts of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to occupational health and safety and where applicable contracts of training such as apprenticeships.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

There are no prerequisite competencies for this unit.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve competency in this unit if they have reading, writing and numeracy skills indicated by the following scales. Description of each scale is given in Volume 2, Part 3 'Literacy and Numeracy'

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a unit of competency

Performance criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT **PERFORMANCE CRITERIA**

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ELEMENT	PERFORMANCE CRITERIA
1 Interact with customers.	1.1 Communication with customers is conducted in a professional and courteous manner according to established procedures.
	1.2 Customer enquiries are responded to promptly and politely and in accordance with established procedures.
	1.3 Personal dress and presentation is maintained in line with established procedures.
	1.4 Appropriate interpersonal skills are used to facilitate accurate and relevant exchange of information.
2 Identify customer needs.	2.1 Customer needs are assessed so that priorities for service delivery can be identified in accordance with established procedures.
	2.2 Appropriate questioning and active listening are used to determine customer needs.
	2.3 Customers are provided with information about available options for meeting their needs and assisted to identify their preferred option.
	2.4 Personal limitations in addressing customer needs are identified and where appropriate assistance is sought from appropriate personnel.
3 Deliver a service to customers.	3.1 Prompt customer service is provided to meet identified needs in accordance with established procedures.
	3.2 Service provided follows OHS policies and procedures and work is appropriately sequenced in accordance with requirements.
	3.3 Service provided is coordinated effectively with others involved on the work site.
	3.4 Customer complaints are handled sensitively and courteously in accordance with established procedures.
	3.5 Opportunities to enhance the quality of service and products are identified and taken whenever

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ELEMENT	PERFORMANCE CRITERIA	
		possible.
4 Evaluate and complete service.	4.1	Own work is monitored and adjusted according to requirements for job quality, customer service and efficient resource use.
	4.2	Customer service records are inspected and verified after service is completed to ensure requirements are met.
	4.3	Appropriate personnel are notified of the completion of the repair work and details are documented in accordance with established procedures and requirements.
	4.4	Variations in the quality of service and/or products from required standards are detected and reported in accordance with established procedures.
	4.5	Additional information or follow-up action is completed in line with customer needs.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence must show that knowledge has been acquired of safe working practices and delivering a service to customers.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

KS01-EC010B Customer service

Evidence shall show an understanding of customer service to an extent indicated by the following aspects:

T1. Enterprise communication methods encompassing:

- Communicating with personnel encompassing:
  - Oral communications
  - Written procedures and work instructions

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REQUIRED SKILLS AND KNOWLEDGE

- Communicating with suppliers
- Communicating with customers

T2. Work activities records encompassing:

- Purpose and extent of maintaining work activities records in an enterprise
- Types of records for maintaining work activities in an enterprise
- Methods for recording and maintaining work records
- Work records required by regulation requirements

T3. Problem solving concepts and techniques encompassing:

- Identify problems - process and quality problems; equipment selection, availability and failure; teamwork and work allocation problems; safety and emergency situations and incident; performance gaps; profit improvement and the like.
- Mathematical Tools - average, standard deviation and the like.
- Use of analytical techniques in problem solving - brainstorming; fishbone diagrams/cause and effect diagrams; logic trees; process logic/process requirements; similarity/difference analysis; pare to analysis; force field/SWOT analysis.
- Using tools to assistance in problem solving - Procedures and work instructions; Safety data sheets; Job cards; Maintenance logs; Plant drawing.
- Determine corrective action:
  - Tools
  - Mode of communication procedure used within each enterprise
  - Established work procedures and policies
  - Size and structure of the teams/enterprise
  - Group goals - team, section, enterprise
  - Enterprise specific conflict resolution procedures
  - Action plans
  - Priority requirements
  - Measurable objectives
  - Resource requirements
  - Methods for reaching objectives
  - Timelines
  - Safety requirements
  - Risk assessment
  - Environmental requirements
- Communicate recommendations - feedback requirements; corrective action and analysis; following up recommendations and the like.
- Implement Monitoring encompassing:
  - Identifying components to be measured
  - Measurement and monitoring techniques

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REQUIRED SKILLS AND KNOWLEDGE

- Measurement and monitoring tools

T4. Enterprise customer relations protocols encompassing:

- Purpose of customer relations
- Procedures for dealing with customers
- Dealing with customer issues

T5. Enterprise quality management system encompassing:

- Purpose of a quality system
- Procedures pertaining to the relevant work function
- Work instructions pertaining to the relevant work function

T6. Instructing users in the use of specific items of equipment and systems encompassing:

- Methods for evaluating user needs - how equipment is used efficiently and safely and identifying wear and tear and damage to the equipment that requires repairing.
- Basic instruction methods - be appropriate to the culture of the users and the equipment for which instruction is given.
- Methods for evaluating user's ability use equipment correctly

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the unit. It must be read in conjunction with the performance criteria and the range statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this unit. It must be used in conjunction with all parts of this unit and performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment	**9.1)** Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the industry-preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances,

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EVIDENCE GUIDE

assessment in part or full can occur outside the workplace. However, it must be in accordance with industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Sources of evidence need to be 'rich' in nature to minimise error in judgment.

Activities associated with normal everyday work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all prerequisites must be met.

Evidence for competence in this unit shall be considered holistically. Each Element and associated performance criteria shall be demonstrated on at least two occasions in accordance with the 'Assessment Guidelines - UEE07'. Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices, including the use of risk control measures as specified in the performance criteria and range statement
  - Apply sustainable energy principles and practices as specified in the performance criteria and range statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in this unit.

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EVIDENCE GUIDE

It may be required by some jurisdictions that RTOs provide a percentile graded result for the purpose of regulatory or licensing requirements.

- Demonstrate an appropriate level of skills enabling employment
- Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures

- Demonstrated consistent performance across a representative range of contexts from the prescribed items below:
  - Deliver a service to customers as described in 8) including:

    A Interacting with customers appropriately.

    B Identifying customer needs accurately.

    C Identifying and resolving customer issues promptly and amicably.

    D Delivering a service.

    E Reflecting on the completed service positively.

    F Dealing with unplanned events by drawing on essential knowledge and skills to provide appropriate solutions incorporated in a holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed in this unit.

These should be used in the formal learning/assessment environment.

Note:

Where simulation is considered a suitable strategy for assessment it must ensure that the conditions for assessment are authentic and as far as possible reproduce and replicate the workplace and is consistent with the approved industry

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EVIDENCE GUIDE

simulation policy.

The resources used for assessment should reflect current industry practices in relation to delivering a service to customers.

Method of assessment

9.4)

This unit shall be assessed by methods given in Volume 1, Part 3 'Assessment Guidelines'.

Note:
Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

For optimisation of training and assessment effort, competence in this unit may be assessed concurrently with any unit or units that require formal documentation.

Range Statement

RANGE STATEMENT

10) This relates to the unit as a whole providing the range of contexts and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

This unit must be demonstrated by delivering a service to customers in any of the electrotechnology disciplines.

Generic terms used throughout this Vocational Standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms that apply are given in Volume 2, Part 2.1.

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Unit Sector(s)

Not Applicable

Competency Field

Competency Field **11)**

Commercial

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UEENEED101A Use computer applications relevant to a workplace

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit covers the basic use of personal computers application relevant to a work function. It encompasses switching the computer on, applying user preferences, selecting basic applications, entering and retrieving information and printing files.

Note:

This unit applies to all aspects of Electrotechnology – engineering applications only. For general competencies related to Information Technologies refer to the latest endorsed IT Training Package.

Application of the Unit

Application of the Unit **2)**

This unit is intended for competency development entry-level employment-based programs incorporated in approved contracts of training. It may be used to augment previously acquired competencies.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a license to practice in the workplace. However, practice in this unit is subject to regulations directly

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License to practice **3)**

related to occupational health and safety and where applicable contracts of training such as apprenticeships.

Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

UEENEEE101A	Apply Occupational Health Safety regulations, codes and practices in the workplace.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve competency in this unit if they have reading, writing and numeracy skills indicated by the following scales. Description of each scale is given in Volume 2, Part 3 ‘Literacy and Numeracy’

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

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Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT		PERFORMANCE CRITERIA	
1	Prepare to use computer applications.	1.1	OHS procedures for a given work area are identified, obtained and understood through established routines and procedures.
		1.2	Established OHS risk control measures and procedures in relation to computer and keyboard use are followed.
		1.3	Information required for the use of the application is obtained from appropriate sources.
		1.4	Computer is started up and desktop icons are manipulated to access desired application, directories and files.
		1.5	On-screen instructions in relation to any anomaly such as a virus warning are followed.
		1.6	Help directory is used to resolve any straightforward start up or access issues or anomalies.
2	Use computer basic application.	2.1	Established OHS risk control measures and procedures for carrying out the work are followed.
		2.2	Information is added, altered or deleted as needed in accordance with application user instructions.
		2.3	Routine checks are made to ensure accuracy of information in accordance with quality requirements.
3	Output information	3.1	Completed files are stored appropriately in

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ELEMENT	PERFORMANCE CRITERIA	
from an application.		accordance with enterprise requirements.
	3.2	Files are printed for a formal record and/or to forward to others.
	3.3	Files are sent via email in a readable format.
4 Shut down computer.	4.1	Files are named, arranged, saved and backed up in accordance with enterprise requirements.
	4.2	Computer shutdown procedures are followed and computer switched off.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of safe working practices using basic computer applications relevant to a workplace.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

KS01-ED101A Basic Computer Applications

Evidence shall show an understanding of computer use basics to an extent indicated by the following aspects:

T1 Starting up

T2 Selecting application

T3 Entering information

T4 Saving

T5 Printing

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the unit and must be read in

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EVIDENCE GUIDE

conjunction with the performance criteria and the range statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this unit. It must be used in conjunction with all parts of this unit and performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the industry-preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accordance with industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Sources of evidence need to be ‘rich’ in nature to minimise error in judgment.

Activities associated with normal everyday work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its ‘richness’. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

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Critical aspects of evidence required to demonstrate competency in this unit **9.2)**

Before the critical aspects of evidence are considered all prerequisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated performance criteria shall be demonstrated on at least two occasions in accordance with the 'Assessment Guidelines – UEE11'. Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices, including the use of risk control measures as specified in the performance criteria and range statement
  - Apply sustainable energy principles and practices as specified in the performance criteria and range statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in this unit. It may be required by some jurisdictions that RTOs provide a percentile graded result for the purpose of regulatory or licensing requirements.
  - Demonstrate an appropriate level of skills enabling employment
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated consistent performance across a representative range of contexts from the prescribed items below:
  - Use basic computer applications relevant to workplace as described in 8) and including:

A	Correctly starting-up a computer.
B	Dealing with anomalies appropriately.
C	Following application instructions to input and output information.
D	Storing information appropriately.

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E	Outputting information to a printer.
F	Forwarding information via email and/or web mail in a readable format.
G	Producing, storing and forwarding engineering related reports and/or results using at least three computer applications according to requirements
H	Shutting down a computer correctly
I	Dealing with unplanned events by drawing on essential knowledge and skills to provide appropriate solutions incorporated in a holistic assessment with the above listed items.

Note:

Successful completion of relevant vendor training may be used to contribute to evidence on which competency is deemed. In these cases the alignment of outcomes of vendor training with performance criteria and critical aspects of evidence shall be clearly identified.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed in this unit.

These should be used in the formal learning/assessment environment.

Note:

Where simulation is considered a suitable strategy for assessment, conditions for assessment must be authentic and as far as possible reproduce and replicate the workplace and be consistent with the approved industry simulation policy.

In addition to the resources listed above, evidence should show demonstrated competency to produce, store and forward engineering related reports and/or results using a range of

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computer applications.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Volume 1, Part 3 'Assessment Guidelines'.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires assessment in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

There are no concurrent assessment recommendations for this unit.

Range Statement

RANGE STATEMENT

10) This relates to the unit as a whole providing the range of contexts and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

This unit shall/may be demonstrated in relation to at least three of the following using computer applications to produce, store and forward engineering related reports and/or results at a basic level.

- Word processing
- Spread sheet
- Drawings
- Business management
- Apparatus set-up
- Note:

Apparatus set-up applications are invariably vendor specific and include

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RANGE STATEMENT

icon-based integration and control applications.

Generic terms used throughout this Vocational Standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms that apply are given in Volume 2, Part 2.1.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Computer Systems

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UEENEED104A Use engineering applications software on personal computers

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit covers the use of computer application relevant to engineering support work functions. It encompasses applying user preferences, using application menus and tools, entering and retrieve information, working with groups and transferring and printing files.

Note:

Examples of engineering application software are Visio, Electronic Work Bench, Lab View, Network Simulator.

Application of the Unit

Application of the Unit **2)**

This unit is intended for competency development entry-level employment-based programs incorporated in approved contracts of training. It may be used to augment previously acquired competencies.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a license to practice in the workplace. However, practice in this unit is subject to regulations directly related to occupational health and safety and where applicable contracts of training such as apprenticeships.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

UEENEEE101A	Apply Occupational Health Safety regulations, codes and practices in the workplace

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve competency in this unit if they have reading, writing and numeracy skills indicated by the following scales. Description of each scale is given in Volume 2, Part 3 ‘Literacy and Numeracy’

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a

Performance Criteria describe the required performance needed to demonstrate achievement of the element.

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competency standard unit	Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Prepare to use computer applications.	1.1	OHS procedures for a given work area are identified, obtained and understood through established routines and procedures.
	1.2	Established OHS risk control measures and procedures in relation to computer and keyboard use are followed.
	1.3	Application software and information required for use is obtained from appropriate sources.
	1.4	On-screen instructions in relation to any anomaly such as a virus warning are followed.
	1.5	Help menu is used to resolve any straightforward start up or access issues or anomalies.
2 Use engineering application software.	2.1	Established OHS risk control measures and procedures for carrying out the work are followed.
	2.2	Techniques that apply to a particular software package are used to produce appropriate files.
	2.3	Routine checks are made to ensure accuracy of information in accordance with quality requirements.
3 Output information from an application.	3.1	Completed files are stored appropriately in accordance with enterprise requirements.
	3.2	Files are printed for formal records and/or forwarded to others.
4 Shut down computer.	4.1	Files are named, arranged, saved and backed up in accordance with enterprise requirements.
	4.2	Computer shutdown procedures are followed and computer switched off.

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of safe working practices using engineering application software.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

KS01-ED104A Personal computers, engineering applications software basic

Evidence shall show an understanding of object orientated programming basics to an extent indicated by the following aspects:

T1 Computer Systems Overview encompassing:

- Safety
- Applications of computers in industry
- Types of computer systems
- Hardware components
- Software and firmware
- Memory
- Peripherals
- Removable storage devices
- PC hardware inventory
- Networking

T2 Operating System Overview encompassing:

- Software layer model
- Function and characteristics of an operating system
- File structure
- Formatting disks
- Boot process
- Configuration files

T3 Windows Operating System encompassing

- Windows screen
- Windows Explorer
- File management
- Managing software, updates, backups and virus protection.

T4 Word Processors encompassing

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REQUIRED SKILLS AND KNOWLEDGE

- Word files
- Formatting
- Engineering symbols
- Tables and lists
- Drawings
- Spelling, grammar, and ‘search-and-replace’
- Printing

T5 Spreadsheets encompassing

- Parts of a spreadsheet
- Excel file management
- Inserting data into spreadsheets
- Formatting spreadsheets
- Charts
- Engineering problem solving
- Printing

T6 Databases encompassing:

- Features and purpose of database
- Searching existing database
- Creating a simple database
- Manipulating data in a database
- Advance sort functions
- Reports

T7 Transferring Data Between Windows Applications encompassing:

- Moving data between Word, Excel and Access

T8 Drawing and Computer Assisted Design (CAD) programs encompassing:

- Computer drawing using applications such as Visio.
- Incorporation of electrical/electronic symbols into computer drawings.

T9 E-mail and Internet Browsers encompassing:

- Browsers
- Search Engines
- Web-based e-mail (e.g. Hotmail)
- Application-based e-mail (e.g. Outlook).

Evidence Guide

EVIDENCE GUIDE

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EVIDENCE GUIDE

9) This provides essential advice for assessment of the unit and must be read in conjunction with the performance criteria and the range statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this unit. It must be used in conjunction with all parts of this unit and performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the industry-preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accordance with industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Sources of evidence need to be ‘rich’ in nature to minimise error in judgment.

Activities associated with normal everyday work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its ‘richness’. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

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Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all prerequisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated performance criteria shall be demonstrated on at least two occasions in accordance with the 'Assessment Guidelines – UEE11'. Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices, including the use of risk control measures as specified in the performance criteria and range statement
  - Apply sustainable energy principles and practices as specified in the performance criteria and range statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in this unit. It may be required by some jurisdictions that RTOs provide a percentile graded result for the purpose of regulatory or licensing requirements.
  - Demonstrate an appropriate level of skills enabling employment
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated consistent performance across a representative range of contexts from the prescribed items below:
  - Use engineering applications software as described in 8) and including:

A Following application instructions to input and output information.

B Storing information appropriately.

C Outputting information to a printer.

D Transferring information between systems.

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E	Saving, storing and backing up files for effective retrieval by others.
F	Dealing with unplanned events by drawing on essential knowledge and skills to provide appropriate solutions incorporated in a holistic assessment with the above listed items.

Note:

Successful completion of relevant vendor training may be used to contribute to evidence on which competency is deemed. In these cases the alignment of outcomes of vendor training with performance criteria and critical aspects of evidence shall be clearly identified.

Context of and specific resources for assessment **9.3)**

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed in this unit.

These should be used in the formal learning/assessment environment.

Note:

Where simulation is considered a suitable strategy for assessment, conditions for assessment must be authentic and as far as possible reproduce and replicate the workplace and be consistent with the approved industry simulation policy.

The resources used for assessment should reflect current industry practices in relation to using engineering application software.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Volume 1, Part 3 ‘Assessment Guidelines’.

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Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires assessment in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no concurrent assessment recommendations for this unit.

Range Statement

RANGE STATEMENT

10) This relates to the unit as a whole providing the range of contexts and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

This unit shall be demonstrated in relation to using at least two of the following types of engineering applications at a basic level.

- Office Applications
- Computer Aided Design
- Engineering data analysis software
- Engineering modelling
- Project management
- Network simulator
- Protocol analyser

Generic terms used throughout this Vocational Standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms that apply are given in Volume 2, Part 2.1.

Unit Sector(s)

Not applicable.

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Competency Field

Competency Field **11)**

Computer Systems

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UEENEEE009B Comply with scheduled and preventative maintenance program processes

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit covers the quality assurance and risk management compliance processes for maintenance of the electrotechnology aspects of plant and equipment. It encompasses working safely and to technical, quality and risk management standards, work specifications and maintenance schedules, sample inspections, evaluating components and completing the necessary maintenance documentation.

Application of the Unit

Application of the Unit **2)**

This unit apply to any qualification in this standard at an AQF 3 level.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit require a license to practice in the workplace where plant and equipment operate at voltage above 50 V a.c. or 120 V d.c. Where refrigeration and air conditioning are involved practice in the workplace is subject to Federal/State/Territory regulations covering the use of refrigerants and the relevant codes of practice; in some

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jurisdictions a licence is required.

Practice in the workplace is also subject to regulations directly related to occupational health and safe and contracts of training such as new apprenticeships.

Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

There are no prerequisite competencies for this unit.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve competency in this unit if they have reading, writing and numeracy skills indicated by the following scales. Description of each scale is given in Volume 2, Part 3 'Literacy and Numeracy'

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

This unit contains Employability Skills

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a

Performance criteria describe the required performance needed to demonstrate achievement of the Element.

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unit of competency	Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare to comply with scheduled maintenance program processes.	1.1 OHS procedures for a given work area are identified, obtained and understood.
	1.2 Established OHS risk control measures and procedures in preparation for the work are followed.
	1.3 Safety hazards which have not previously identified are noted and established risk control measures are implemented.
	1.4 The maintenance schedule and process compliance requirements are confirmed and work appropriately sequenced in accordance with established procedures.
	1.5 Appropriate person(s) are consulted to ensure the work is coordinated effectively with others involved on the work site.
	1.6 Location equipment to be maintained is determined from maintenance schedule procedures and/or system specifications and diagrams.
	1.7 Resources needed to conduct the maintenance is obtained in accordance with established procedures and checked against job requirements.
	1.8 Tools, equipment and testing devices needed to conduct the maintenance are obtained in accordance with established procedures and checked for correct operation and safety.
2 Comply with scheduled maintenance program processes.	2.1 OHS risk control measures and procedures for carrying out the work are followed.
	2.2 Test or measure on a live and operating system in strict accordance with OHS requirements and

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ELEMENT	PERFORMANCE CRITERIA	
		within established safety procedures.
	2.3	Circuits/machines/plant are checked as being isolated where necessary in strict accordance OHS requirements and procedures.
	2.4	Apparatus to be maintained is inspected and evaluated for compliance with requirements in accordance with maintenance schedule.
	2.5	Non-compliant apparatus/components are documented and arrangements made for their rectification in accordance with established procedures.
	2.6	Established methods for dealing with unexpected situations are discussed with appropriate person or persons and documented.
	2.7	Ongoing checks of the quality of the maintenance are undertaken in accordance with established procedures.
	2.8	Maintenance process compliance is performed efficiently without waste of materials or damage to apparatus and the surrounding environment or services and using sustainable energy practices.
3 Completion of maintenance compliance processes.	3.1	OHS work completion risk control measures and procedures are followed.
	3.2	Work site and equipment is cleaned and made safe in accordance with established procedures.
	3.3	Final checks are made to verify that the maintenance complies with requirements.
	3.4	Maintenance completion is documented and appropriate person(s) notified in accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

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REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of safe working practices and complying with scheduled and preventative maintenance program processes.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

KS01-EE009B Scheduled maintenance process

Evidence shall show an understanding of maintenance processors to an extent indicated by the following aspects:

- Maintenance principles encompassing:
  - maintenance function
  - role of maintenance department
  - occupational health and safety requirements
- Maintenance systems encompassing:
  - maintenance terminology
  - preventative maintenance
  - predictive maintenance
  - corrective maintenance
- Data acquisition encompassing:
  - plant history cards/files
  - inspection techniques
  - predictive maintenance
  - remote visual inspection
  - non-destructive testing
  - thermography
  - vibration analysis
  - oil analysis
- Maintenance plan encompassing:
  - characteristics of plant operation
  - assessment of failure characteristics
  - link failure characteristics to maintenance systems
  - identify production windows
  - resources
  - labour
  - materials
  - establish plan
  - implementation procedures

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REQUIRED SKILLS AND KNOWLEDGE

- Review of maintenance plan encompassing:
  - analysis of records
  - manual recording methods
- Computerised recording methods

Evidence Guide

EVIDENCE GUIDE

9) The evidence guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

The Evidence Guide forms an integral part of this unit. It must be used in conjunction with all parts of the unit and performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

9.1)

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the industry-preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accordance with industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Sources of evidence need to be 'rich' in nature to minimise error in judgment.

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EVIDENCE GUIDE

Activities associated with normal everyday work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all prerequisites must be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated performance criteria shall be demonstrated on at least two occasions in accordance with the 'Assessment Guidelines - UEE07'. Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices, including the use of risk control measures as specified in the performance criteria and range statement
  - Apply sustainable energy principles and practices as specified in the performance criteria and range statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in this unit. It may be required by some jurisdictions that RTOs provide a percentile graded result for the purpose of regulatory or licensing requirements.
  - Demonstrate an appropriate level of skills enabling employment
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated consistent performance across a representative range of contexts from the prescribed items below:
  - Comply with scheduled and preventative maintenance program processes as described in 8) and including:

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EVIDENCE GUIDE

A Interpreting maintenance schedule requirements correctly.

B Following quality assurance and risk management compliance processes.

C Following maintenance schedule.

D Inspecting and evaluating apparatus for quality assurance and risk compliance.

E Arranging for corrective action of non compliant apparatus.

F Documenting maintenance work.

G Dealing with unplanned events by drawing on essential knowledge and skills to provide appropriate solutions incorporated in a holistic assessment with the above listed items.

Note:
Successful completion of relevant vendor training may be used to contribute to evidence on which competency is deemed. In these cases the alignment of outcomes of vendor training with performance criteria and critical aspects of evidence shall be clearly identified.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed in this unit.

These should be used in the formal learning/assessment environment.

Note:

Where simulation is considered a suitable strategy for assessment, conditions for assessment must be authentic and as far as possible reproduce and replicate the workplace and be consistent with the approved industry simulation policy.

The resources used for assessment should reflect current industry practices in relation to complying with scheduled and

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EVIDENCE GUIDE

	preventative maintenance program processes.
Method of assessment	**9.4)** This unit shall be assessed by methods given in Volume 1, Part 3 'Assessment Guidelines'. Note: Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.
Concurrent assessment and relationship with other units	**9.5)** There are no concurrent assessment recommendations for this unit.

Range Statement

RANGE STATEMENT

10) This relates to the unit as a whole providing the range of contexts and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

This unit shall be demonstrated in relation to scheduled and preventative maintenance compliance processes of at least three different items of installed equipment in the any of the following electrotechnology disciplines.

- Appliances
- Business equipment
- Computers
- Data Communications
- Electrical
- Electrical Machines
- Electronics
- Fire protection

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RANGE STATEMENT

- Instrumentation
- Lifts
- Mining, electrical
- Marine, electrical
- Refrigeration and Air Conditioning
- Uninterruptible power supplies (UPS)
- Stand alone generator sets
- Renewable / sustainable energy
- Security technology

Generic terms used throughout this Vocational Standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms that apply are given in Volume 2, Part 2.1.

Unit Sector(s)

Not Applicable

Competency Field

Competency Field **11)**

Electrotechnology

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UEENEEE038B Participate in development and follow a personal competency development plan

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit covers the application of skills and knowledge in taking responsibility for one's own competency development. It encompasses understanding the structure of a competency development plan, participating the development of a personal competency development plan, understanding responsibilities and obligation under competency development plan, following activities for developing competency, self-monitoring competency development and meeting trainee obligations for periodic reporting of competency development activities.

Application of the Unit

Application of the Unit **2)**

This unit is intended to support competency development entry-level employment and post qualification based programs incorporated in approved contracts of training and approved programs.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a license to practice in the workplace. However, practice in this unit is subject to regulations directly

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related to occupational health and safety and where applicable contracts of training such as apprenticeships.

Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

There are no prerequisite competencies for this unit.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve competency in this unit if they have reading, writing and numeracy skills indicated by the following scales. Description of each scale is given in Volume 2, Part 3 'Literacy and Numeracy'

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

This unit contains Employability Skills

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a unit of competency	Performance criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the evidence guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Participate in the development of a personal competency development plan.	1.1 The nature of competency-based training is sought from discussions with appropriate persons and understood.
	1.2 The responsibilities/obligations of trainees/learners, their employers, trainers and assessors in a competency-based development program are sought from discussions with appropriate persons and understood.
	1.3 Competencies to be achieved in a personal competency development plan are established in discussions with appropriate persons.
	1.4 Details on how to achieve the individual competencies in the plan are sought from discussions with appropriate persons and understood.
2 Follow a personal competency development plan.	2.1 All aspects of the competency development plan are put into practice and followed diligently.
	2.2 Opportunities to practise skills and apply knowledge relative to a particular competency are pursued
	2.3 Assistance is sought from appropriate persons to overcome difficulties in develop skills and apply knowledge relevant to a particular competency.
	2.4 Progress in competency development is self monitored against the competency development plan.
	2.5 Modifications to the personal competency development plan are made in consultation with appropriate persons.
	2.6 Trainee/learners responsibility for periodic and timely reporting of competency development activities is followed.

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of safe working practices and participating in development and following a personal competency development plan.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

KS01-EE038B Responsibilities under a competency development plan

Evidence shall show an understanding of responsibilities under a competency development plan to an extent indicated by the following aspects:

- Competency Development (Training) Plans encompassing:
  - state/territories requirements (acts/regulations)
  - competency development (training) contracts
  - competency development (training) period
  - purpose of competency development (training) plans
  - process in developing competency development (training) plans
  - parties involved in the competency development (training) plan
- Qualification Structure encompassing:
  - scope of work
  - Training Packages - electrotechnology
  - competency standard units (CSUs)
  - structure of Qualification
  - off-Job Requirements
  - on-Job Requirements
- Responsibilities of Parties to the contract encompassing:
  - employer responsibilities
  - learner responsibilities
  - RTO responsibilities
  - State Training Authorities (STA)
- Electrotechnology Industry Career Opportunities encompassing:
  - industry Areas
  - qualification levels
  - career paths
- Industry customs and practices encompassing:

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REQUIRED SKILLS AND KNOWLEDGE

- industry bodies – employer and employee representatives
- regulatory bodies – including licensing/registration, OHS, IR, training authorities – apprentice/trainee regulation
- vocational and technical education system – Australian Qualification Framework (AQF), credentials, Australian Qualification Training Framework (AQTF)

- Monitoring of Workplace Evidence encompassing:
  - workplace exposure and practices and relationship with competency standard units
  - methods of collecting workplace evidence
  - monitoring period cycle
  - requirements of workplace evidence
  - actions taken for unsatisfactory progression
  - role of state training authority (STA)
  - apprentice/learner responsibilities
  - employer responsibilities
- RTO Policies encompassing:
  - apprentice/Learner Responsibilities
  - teachers/Trainers Responsibilities
  - absenteeism
  - off-Job component assessment specifications
  - on-Job component assessment specifications
  - qualification completion requirements and award
  - advanced standing and/or RPL
  - result review procedures
- Apprentice/Learner Discipline Policy encompassing:
  - apprentices/Learners rights
  - apprentice/Learner responsibilities
  - breaches of discipline
  - types of penalties Apprentice/Learner Responsibilities
- Attendance at the Vocational and Technical Education Centre encompassing:
  - importance of attendance
  - record management of attendance
  - attendance cards
  - advice to employer of absences
- Fire and Emergencies at the Vocational and Technical Education Centre encompassing:
  - designated fire and emergency exists
  - procedures in the event of a fire

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REQUIRED SKILLS AND KNOWLEDGE

- evacuation procedures
- assembly points importance of attendance

- Occupational Health and Safety at the Vocational and Technical Education Centre encompassing:
  - eye protection
  - foot protection
  - protective clothing
  - personal injuries
  - mobile phones and personal belonging
  - dress regulations
  - rotating machinery, designated fire and emergency exists
- Entry Requirements encompassing:
  - numeracy requirements
  - literacy requirements
  - vocational and technical education centre support mechanisms
  - testing and appropriate action by learner Eye protection
- Vocational and Technical Education Centre Tour encompassing:
  - vocational and technical education centre layout
  - building layout
  - tour of building and vocational and technical education centre

KS02-EE038B Methods of monitoring and reporting competency development activities

- Evidence shall show an understanding of methods of monitoring and reporting workplace activities indicated by the following aspects:
- RTOs responsibility to receive and monitor workplace activities of the apprentice/learner
- Industry requirements for monitoring workplace evidence
- Acceptable methods for monitoring and reporting workplace activities
- Apprentice’s/Learner’s responsibility to participate in the reporting of workplace activities
- RTOs requirements in periodically evaluating development of apprentices/learners from the workplace activities information gathered, and providing feedback and advice on areas requiring improvement
- Employers responsibilities to participate in monitoring, reporting and confirming workplace activities, and assisting in overcoming areas requiring development by the apprentice/learner
- Options for appeal or assistance from RTO or State Training Authority (STA)

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Evidence Guide

EVIDENCE GUIDE

9) The evidence guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

The Evidence Guide forms an integral part of this unit. It must be used in conjunction with all parts of the unit and performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

9.1)

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the industry-preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accordance with industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Sources of evidence need to be 'rich' in nature to minimise error in judgment.

Activities associated with normal everyday work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of

9.2)

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EVIDENCE GUIDE

evidence required to demonstrate competency in this unit

Before the critical aspects of evidence are considered all prerequisites must be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated performance criteria shall be demonstrated on at least two occasions in accordance with the 'Assessment Guidelines - UEE07'. Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices, including the use of risk control measures as specified in the performance criteria and range statement
  - Apply sustainable energy principles and practices as specified in the performance criteria and range statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in this unit. It may be required by some jurisdictions that RTOs provide a percentile graded result for the purpose of regulatory or licensing requirements.
  - Demonstrate an appropriate level of skills enabling employment
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated consistent performance across a representative range of contexts from the prescribed items below:
  - Participate in development and follow a personal competency development plan as described in 8) and including:

    A Seeking and understanding the responsibilities under a competency development plan.

    B Seeking and understanding how to achieve the individual competencies in the plan.

    C Following all aspects of the plan diligently.

    D Pursuing opportunities to develop competency.

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EVIDENCE GUIDE

E Seeking assistance to overcome difficulties in developing competency.

F Self-monitoring competency development.

G Periodically reporting competency development activities.

H Dealing with unplanned events by drawing on essential knowledge and skills to provide appropriate solutions incorporated in a holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed in this unit.

These should be used in the formal learning/assessment environment.

Note:

Where simulation is considered a suitable strategy for assessment, conditions for assessment must be authentic and as far as possible reproduce and replicate the workplace and be consistent with the approved industry simulation policy.

The resources used for assessment should reflect current industry practices in relation to participating in development and following a personal competency development plan.

Method of assessment

9.4)

This unit shall be assessed by methods given in Volume 1, Part 3 'Assessment Guidelines'.

Note:
Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

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EVIDENCE GUIDE

Concurrent assessment and relationship with other units	**9.5)** For optimisation of training and assessment effort, competence development in this unit may be assessed concurrently with other units in a qualification.

Range Statement

RANGE STATEMENT

10) This relates to the unit as a whole providing the range of contexts and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

This unit shall be demonstrated in relation to participating in development and follow a personal competency development plan in an electrotechnology discipline with the following attributes:

- responsibility for one's own competency development in developing and applying skills and knowledge
- structure of a competency development plan
- development of a personal competency development plan participation
- responsibilities and obligation under the competency development plan
- activities for developing competency followed
- competency development self-monitoring
- trainee obligations met
- periodic reporting of competency development activities met

Participating in development and follow a personal competency development plan shall be demonstrated in any of the following Electrotechnology disciplines:

- Automation technologies
- Computers
- Data Communications
- Electrical
- Electrical Machines
- Electronics
- Fire protection
- Instrumentation

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RANGE STATEMENT

- Refrigeration and Air Conditioning
- Renewable / sustainable energy
- Security technology

Generic terms used throughout this Vocational Standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms that apply are given in Volume 2, Part 2.1.

Unit Sector(s)

Not Applicable

Competency Field

Competency Field **11)**

Electrotechnology

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UEENEEE101A Apply Occupational Health and Safety regulations, codes and practices in the workplace

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This unit specifies the mandatory requirements of occupational health and safety and how they apply to the various electrotechnology work functions. It encompasses responsibilities for health and safety, risk management processes at all operative levels and adherence to safety practices as part of the normal way of doing work.

Application of the Unit

Not Applicable

Licensing/Regulatory Information

1.2) License to practice

During Training: Competency development activities are subject to regulations directly related to licencing, occupational health and safety and where applicable contracts of training such as apprenticeships.

In the workplace: The application of the skills and knowledge described in this unit require a license to practice in the workplace where work is carried out on electrical equipment or installations which are designed to operate at voltages greater than 50 V a.c. or 120 V d.c.

Other conditions may apply under State and Territory legislative and regulatory requirements.

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Pre-Requisites

Prerequisite Unit(s) **2**)

2.1) **Competencies**

There are no prerequisite competencies for this unit.

Employability Skills Information

Employability Skills **3**)

This unit contains Employability Skills

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Application of the Unit **4**)

This unit addresses information, processes and techniques for the application of general occupational health and safety requirements in workplaces and is essential for employees without managerial or supervisory responsibilities

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a unit of competency

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare to enter a	1.1 Work area access permits are obtained from appropriate personnel according to established

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ELEMENT	PERFORMANCE CRITERIA	
work area		procedures
	1.2	Safe work methods for controlling risk obtained, read and understood prior to undertaking a work activity.
	1.3.	Preparations for electrical and non-electrical isolation are carried out to prevent creation of hazards from loss of machine/system/process control according to established procedures.
	1.4	Tools and equipment needed for the work are checked for safety and correct functionality according to established procedures and regulatory requirements.
2 Apply safe working practices.	2.1	Safe work methods for controlling risk are followed accurately.
	2.2	Workplace procedures for dealing with accidents, fires and emergencies are followed according to work procedures and scope of responsibility and competencies.
3. Follow workplace procedures for hazard identification and risk control	3.1	Hazards are identified and control measures implemented and monitored through active participation in the consultation process with employer and other employees.
	3.2	Hazards in the work area are recognised and reported to appropriate personnel according to established procedures.
	3.3	OHS records of incidents are completed in accordance with regulatory requirements and established procedures.
	3.4	Workplace instructions and training are followed accurately within established procedures.

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of safe working practices and applying OHS practices in the workplace.

The knowledge and skills shall be contextualised to current industry standards, technologies and practices.

KS01-EE101A Occupational Health and Safety principles

Evidence shall show an understanding of Occupational Health and Safety to an extent indicated by the following aspects

T1 The basic legal requirements covering occupational health and safety in the workplace encompassing:

- underlying principles of OH&S
- general aims and objectives of the relevant state or territory legislation relating to OH&S.
- employer and employee responsibilities, rights and obligations.
- major functions of safety committees and representatives.
- powers given to Occupational Health and Safety Inspectors
- housekeeping and potential hazards in relation to improper housekeeping
- selecting appropriate personal protective equipment (PPE) given hazardous situations

T2 The work environment encompassing:

- typical hazards associated with a range of work environments
- procedures used to control the risks associated with these hazards
- principles of risk assessment / management and state the purpose of each.
- hierarchy of OH&S hazard control measures.
- required documentation for risk assessment.
- commonly used workplace safety signs.
- workplace emergencies that pose a threat to health and safety and suitable procedure for an emergency workplace evacuation.
- appropriate fire extinguisher for a given type of fire.
- requirements for the location, mounting and maintenance of portable fire extinguishers.
- basic process of fighting a fire.
- Importance of safe premises, buildings and security in an industrial setting and the consequences of non- compliance.
- standard work procedure.

T3 Manual Handling encompassing:

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REQUIRED SKILLS AND KNOWLEDGE

- typical manual handling injuries and the effect they can have on lifestyle
- situations that may cause manual handling injuries
- correct procedures for lifting and carrying to prevent manual handling injuries

T4 Chemicals in the workplace encompassing:

- hazardous substances and dangerous goods.
- classification of chemicals as hazardous substances and/or dangerous goods
- requirements for labelling of chemicals in the workplace
- safe storage procedures for chemicals
- purpose and interpretation of material safety data sheet (MSDS)

T5 Working at heights encompassing:

- dangers associated with working on ladders and scaffolds
- identification of work area as a height risk and use appropriate safety equipment to prevent a fall
- selecting an appropriate ladder for a given situation and perform a safety check before use
- precautions that should be taken when ascending and working off a ladder
- precautions that should be taken when working on and around a scaffold and elevated platforms.

T6 Confined spaces encompassing:

- hazards associated with working in a confined space
- identifying workplace situations that could be classified as a confined space
- control measures for working in a designated confined space

T7 Physical and psychological hazards encompassing:

- short and long term effects of excessive noise and techniques to avoid damage to hearing due to excessive noise
- effects of vibration on the human body and work practices to protect against vibration
- effects of thermal stress on the human body and work practices to protect against thermal stress
- effects of ultraviolet (UV) radiation on the human body and work practices to protect against UV radiation.
- dangers associated with laser operated equipment and tools and suitable protective measures to overcome the danger.
- occupational overuse syndrome, how it occurs and means to overcome it
- factors that cause stress in the workplace, symptoms of a person suffering from stress and personal stress management techniques
- detrimental effects and dangers of drug and alcohol use in the workplace

T8 Working safely with electricity encompassing:

- effects of electric shock on the human body

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REQUIRED SKILLS AND KNOWLEDGE

- common causes of electrical accidents
- precautions that can minimise the chance of electric shock (earthing, extra low voltage, fuses, circuit breakers and residual current devices – RCDs)
- protection offered by a residual current device (RCD)
- need for ensuring the (safe) isolation of an electrical supply
- appropriate method of removing an electric shock victim from a live electrical situation

T9 Life support - CPR in the workplace encompassing:

- First Aid.
- responsibilities of the First Aider.
- priorities of first aid management for any accident or injury.
- procedures required at an accident scene.
- legal and ethical issues, which may impact on the management of care.
- 'Duty of Care'.
- examination of a casualty for injuries.
- effect of cardio pulmonary arrest on the body.
- Managing simulated conditions of: airway obstruction; respiratory arrest and cardio pulmonary arrest,
- single and two-person cardio pulmonary resuscitation (CPR).
- signs and symptoms of an altered level of consciousness
- management of simulation of a casualty with an altered level of consciousness.
- signs and symptoms of shock.
- management of simulation of a casualty in shock

Evidence Guide

EVIDENCE GUIDE

9) The evidence guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

The Evidence Guide forms an integral part of this unit. It must be used in conjunction with all parts of the unit and performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment	**9.1**) Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over

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time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the industry-preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accordance with industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Sources of evidence need to be 'rich' in nature to minimise error in judgment.

Activities associated with normal everyday work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all prerequisites must be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated performance criteria shall be demonstrated on at least two occasions in accordance with the 'Assessment Guidelines - UEE07'. Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able

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to:

- Implement Occupational Health and Safety workplace procedures and practices, including the use of risk control measures as specified in the performance criteria and range statement encompassing:
- Apply sustainable energy principles and practices as specified in the performance criteria and range statement
- Demonstrate an understanding of the essential knowledge and associated skills as described in this unit. It may be required by some jurisdictions that RTOs provide a percentile graded result for the purpose of regulatory or licensing requirements.
- Demonstrate an appropriate level of skills enabling employment
- Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures

- Demonstrated consistent performance across a representative range of contexts from the prescribed items below:
  - Applying OHS practices in the workplace as described in 8) and including:

A Preparing to enter the workplace including, the use of work permits and clearances and isolation permissions.

B Understanding and following risk control safe work methods.

C Applying work procedures and instructions as they apply to risk control measures.

D Dealing with accidents and emergencies within the scope of responsibility.

E Participation in consultation processes, identifying hazards and implementing and monitoring control measures.

F Dealing with unplanned events

Note:
Ability to implement these Occupation Health and Safety

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EVIDENCE GUIDE

measures shall be demonstrated on all occasions safety issues arise.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed in this unit.

These should be used in the formal learning/assessment environment.

Note:

Where simulation is considered a suitable strategy for assessment, conditions for assessment must be authentic and as far as possible reproduce and replicate the workplace and be consistent with the approved industry simulation policy.

The resources used for assessment should reflect current industry practices in relation to applying OHS practices in the workplace.

Method of assessment

9.4)

This unit shall be assessed by methods given in Volume 1, Part 3 'Assessment Guidelines'.

Note:
Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

This unit shall be assessed concurrently, as it relates to other units undertaken in a possible skill clusters or qualification.

Components of this unit are included in the critical aspects of evidence of all units to help ensure the appropriate level of responsibility for safety has been acquired

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Range Statement

RANGE STATEMENT

8) This relates to the unit as a whole providing the range of contexts and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

This unit shall be demonstrated in relation to each of the following

- Relevant Occupational Health and Safety legislation, regulations and codes of practice related to hazards present in the industry and particular workplace
- Accepted industry work procedures and the specific safety procedures and work instructions for particular workplace.

Generic terms used throughout this Vocational Standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms that apply are given in Volume 2, Part 2.1.

Unit Sector(s)

Not Applicable

Competency Field

2.2) Literacy and numeracy skills

Participants are best equipped to achieve competency in this unit if they have reading, writing and numeracy skills indicated by the following scales. Description of each scale is given in Volume 2, Part 3 'Literacy and Numeracy'

Reading	3	Writing	3	Numeracy	3

Custom Content Section

Competency Field 5)

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Competency Field 5)

Electrotechnology

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UEENEEE102A Fabricate, assemble and dismantle utilities industry components

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This unit covers basic fitting and fabrication techniques as they apply in the various utilities industry work functions. It encompasses the safe use of hand, fixed and portable power tools; cutting, shaping joining and fixing using metallic and non-metallic materials; dismantling and assembling equipment; basic mechanical measurement and marking-out and reading drawings/diagrams.

Application of the Unit

Not Applicable

Licensing/Regulatory Information

1.2) License to practice

During Training: Competency development activities are subject to regulations directly related to licencing, occupational health and safety and where applicable contracts of training such as apprenticeships.

In the workplace: The application of the skills and knowledge described in this unit require a license to practice in the workplace where work is carried out on electrical equipment or installations which are designed to operate at voltages greater than 50 V a.c. or 120 V d.c.

Other conditions may apply under State and Territory legislative and regulatory requirements.

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Pre-Requisites

Prerequisite Unit(s) **2)**

2.1) Competencies

Granting competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

UEENEEE101A Apply Occupational Health and Safety regulations, codes and practices in the workplace

2.2) Further Information:

For the full prerequisite chain details for this unit please refer to Table 2 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

This unit contains Employability Skills

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Application of the Unit **4)**

4.1) General Application

This unit applies to persons entering work in utilities industry and may be used in school-based vocational programs.

4.2) Importation

RTOs wishing to import this unit into any qualification under the flexibility provisions of NQC Training Package Policy

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Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a unit of competency

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Prepare for dismantling, assembling and fabrication work.	1.1	OHS procedures for a given work area are obtained and understood through established routines and procedures.
	1.2	Established OHS risk control measures and procedures in preparation for the work are followed.
	1.3	Safety hazard not previously identified are reported and advice on risk control measures is sought from the work supervisor.
	1.4	The nature of the work is obtained from documentation and from work supervisor to establish the scope of work to be undertaken.
	1.5	Advice is sought from the work supervisor to ensure the work is coordinated effectively with others.
	1.6	Materials required for the work are obtained in accordance with established routines and procedures.
	1.7	Tools, equipment and measuring devices needed to carry out the work are obtained and checked for correct operation and safety.
	1.8	Cutting tools such as drills and chisels are sharpened to suit the material on which they are to be used.
2 Dismantle and assemble utilities industry apparatus.	2.1	Established OHS risk control measures and procedures for carrying out the work are followed.
	2.2	Circuits/machines/plant are checked as being isolated where necessary in strict accordance OHS requirements and procedures.

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ELEMENT	PERFORMANCE CRITERIA	
	2.3	Appropriate tools are selected and used correctly and safely in dismantling and assembling apparatus.
	2.4	Manufacturer apparatus dismantling and assembling guides are used where applicable.
	2.5	Components are marked or tagged during the dismantling to help ensure correct and efficient reassembly.
	2.6	Dismantled components and parts are stored to protect them against loss or damage.
	2.7	Apparatus is dismantled and assembled efficiently without waste of materials and energy and/or damage to apparatus and the surrounding environment or services.
	2.8	Procedures for referring non-routine events to immediate supervisor for directions are followed.
	2.9	Routine quality checks are carried out in accordance with work instructions.
	2.10	OHS risk control work completion measures and procedures are followed.
	2.11	Work site is cleaned and made safe in accordance with established procedures.
	2.12	Work supervisor is notified of the completion of the work in accordance with established procedures.
3 Fabricate utilities industry components.	3.1	Established OHS risk control measures and procedures for carrying out the work are followed.
	3.2	Circuits/machines/plant are checked as being isolated where necessary in strict accordance OHS requirements and procedures.
	3.3	Appropriate tools are selected and used correctly and safely in fabricating components.
	3.4	Drawings and instruction for the fabrication of components are followed.
	3.5	Component dimensions are determined directly or by calculation from information given in job drawings and

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ELEMENT	PERFORMANCE CRITERIA	
		instructions.
	3.6	Components are fabricated efficiently without waste of materials and energy and/or damage to the surrounding environment or services.
	3.7	Procedures for referring non-routine events to immediate supervisor for directions are followed.
	3.8	Routine quality checks are carried out in accordance with work instructions.
	3.9	OHS risk control work completion measures and procedures are followed.
	3.10	Work site is cleaned and made safe in accordance with established procedures.
	3.11	Work supervisor is notified of the completion of the work in accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of safe working practices and fabricating, dismantling, assembling of utilities industry components.

The knowledge and skills shall be contextualised to current industry standards, technologies and practices.

KS01-EE102A Hand and power tools and their application

Evidence shall show an understanding of hand and power tools and their application to an extent indicated by the following aspects:

T1 Mechanical drawing interpretation and sketching encompassing:

- drawing standards and conventions used in drawings of mechanical components as specified in AS1100
- basic abbreviations and symbols used in drawing of mechanical components
- interpretation of mechanical drawings commonly used in the electrotechnology industry (orthogonal projection, third angle - detail and assembly drawings, pictorial

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REQUIRED SKILLS AND KNOWLEDGE

views)

- laying out a drawing of mechanical components using engineering drawing convention.
- freehand drawings of mechanical components showing all information needed for its manufacture/fabrication

T2 Workshop planning and materials encompassing:

- methods used to work safely in an industrial work environment.
- typical non-electrical hazards in the workplace
- control measures for dealing with hazards identified.
- Conducting a risk assessment on a given work environment, documenting and assessing the risks identified
- type of metallic and non-metallic materials used in the electrotechnology industry and application of the common materials
- planning process

T3 Measuring and marking out encompassing:

- reasons for measuring and marking out
- tools used for marking out
- measuring and marking out a project accurately following correct procedures.
- sustainable energy work practices related to reducing waste when marking out.

T4 Holding and cutting encompassing:

- common tools for holding (bench vices, multi-grips, vice grips, wrenches).
- common tools for cutting metallic and non-metallic material (hacksaws, wood saws, chisels, pliers, files)
- procedure for using a range of tools for cutting, shaping, and finishing metallic and non-metallic materials
- safety procedures when using holding and cutting tools

T5 Drills and drilling encompassing:

- types of drills used in the electrotechnology industry
- sharpening twist drills
- drilling metallic and non-metallic components
- safe use of a bench drill

T6 Tapping and threading encompassing:

- type and size of commonly used threads used in electrotechnology work
- taps and tap wrenches
- tapping metallic and non-metallic components
- stock and die tools
- threading metallic and non-metallic components

T7 General Hand Tools encompassing:

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REQUIRED SKILLS AND KNOWLEDGE

- hammers used in electrotechnology work
- screwdrivers used in electrotechnology work
- spanners and sockets used in electrotechnology work
- pliers used in electrotechnology work
- assembling components applicable to electrotechnology industry using a variety of hand tools.

T8 Joining techniques encompassing:

- types of machine screws and nuts
- forms of welding (Oxy-acetylene, electric arc welding).
- forms of brazing and hard soldering
- process of soft soldering
- joining components using machine screws
- joining components using welding, brazing or soldering techniques

T9 Portable electric power tools encompassing:

- portable electric power tools (grinders, drills, jigsaws, saws)
- applications of portable electric power tools used in the electrotechnology work.
- using portable power tools.
- fabricating components using power tools (drills, grinders)

T10 Sheet metal work encompassing:

- types of sheet metal materials used in the electrotechnology work.
- names and applications of the types of fabrication materials.
- tools used with sheet metals in electrotechnology work (hacksaw, tinsnips, guillotines, punches, notching tools, folding machines)
- techniques used in fabricating sheet metal (cutting, bending, drilling/punching, joining, cutting mitres).
- marking out, cutting, bending, drilling and/or cutting and/or punching holes, joining and cutting mitred joints using sheet metal.
- sustainable energy work practices to reducing waste when fabricating using sheet metal.
- fabricating components using sheet metal and fabrication tools.

T11 Low tolerance measurement encompassing:

- tolerance
- techniques in using vernier callipers
- techniques in using micrometers.
- using vernier callipers to measure engineering components
- using micrometers to measuring engineering components

T12 Dismantling and assembly techniques encompassing:

- tools used in dismantling and assembling electrotechnology equipment (spanners, screwdrivers, bearing pullers, etc).

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REQUIRED SKILLS AND KNOWLEDGE

- procedures for ensuring the safe treatment of dismantled components.
- dismantling electrical, electronic, instrumentation or refrigeration/air conditioning piece of equipment using correct procedures.
- assembling electrical, electronic, instrumentation or refrigeration/air conditioning piece of equipment using correct procedures.

Evidence Guide

EVIDENCE GUIDE

9) The evidence guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

The Evidence Guide forms an integral part of this unit. It must be used in conjunction with all parts of the unit and performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

9.1)

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the industry-preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accordance with industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Sources of evidence need to be 'rich' in nature to minimise error in judgment.

Activities associated with normal everyday work have a bearing

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on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all prerequisites must be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated performance criteria shall be demonstrated on at least two occasions in accordance with the 'Assessment Guidelines - UEE07'. Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices, including the use of risk control measures as specified in the performance criteria and range statement
  - Apply sustainable energy principles and practices as specified in the performance criteria and range statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in this unit. It may be required by some jurisdictions that RTOs provide a percentile graded result for the purpose of regulatory or licensing requirements.
  - Demonstrate an appropriate level of skills enabling employment
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated consistent performance across a representative range of contexts from the prescribed items below:
  - Fabricate, dismantle, assemble of utilities industry components as described in 8) and including:

A Selecting and using hand tools appropriate to a task correctly and safely

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EVIDENCE GUIDE

B Selecting and using power tools appropriate to a task correctly and safely

C Sharpening at least two drill bits each for use different types of material.

D Interpreting mechanical drawings/diagrams and instructions correctly.

E Dismantle and assemble an apparatus relevant to utilities industry discipline in which competency is sought.

F Fabricate a component relevant to the utilities industry discipline in which competency is sought.

G Dealing with unplanned events

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed in this unit.

These should be used in the formal learning/assessment environment.

Note:

Where simulation is considered a suitable strategy for assessment, conditions for assessment must be authentic and as far as possible reproduce and replicate the workplace and be consistent with the approved industry simulation policy.

The resources used for assessment should reflect current industry practices in relation to dismantling, assembling and fabricating utilities industry components.

Method of assessment

9.4)

This unit shall be assessed by methods given in Volume 1, Part 3 'Assessment Guidelines'.

Note:
Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended

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	for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.
Concurrent assessment and relationship with other units	**9.5**) For optimisation of training and assessment effort, competency development in this unit may be arranged concurrently with unit:

Range Statement

RANGE STATEMENT

8) This relates to the unit as a whole providing the range of contexts and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

This unit shall be demonstrated in relation to installation, fault finding, maintenance, repair or development work functions in any of the following disciplines:

- Electrotechnology Disciplines
- Gas industry Disciplines
- ESI Transmission, Distribution and Rail Disciplines
- ESI Generation Disciplines

Generic terms used throughout this Vocational Standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms that apply are given in Volume 2, Part 2.1.

Unit Sector(s)

Not Applicable

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Competency Field

2.3) Literacy and numeracy skills

Participants are best equipped to achieve competency in this unit if they have reading, writing and numeracy skills indicated by the following scales. Description of each scale is given in Volume 2, Part 3 'Literacy and Numeracy'

Reading	3	Writing	3	Numeracy	3

2.3) Literacy and numeracy skills

Competency Field **5**)

Utilities industry

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UEENEEE104A Solve problems in d.c. circuits

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This unit covers determining correct operation of single source d.c. series, parallel and series-parallel circuits and providing solutions as they apply to various electrotechnology work functions. It encompasses working safely, problem solving procedures, including the use of voltage, current and resistance measuring devices, providing solutions derived from measurements and calculations to predictable problems in single and multiple path circuits.

Application of the Unit

Not Applicable

Licensing/Regulatory Information

1.2) License to practice

During Training: Competency development activities are subject to regulations directly related to licencing, occupational health and safety and where applicable contracts of training such as apprenticeships.

In the workplace: The application of the skills and knowledge described in this unit require a license to practice in the workplace where work is carried out on electrical equipment or installations which are designed to operate at voltages greater than 50 V a.c. or 120 V d.c.

Other conditions may apply under State and Territory legislative and regulatory requirements.

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Pre-Requisites

Prerequisite Unit(s) **2)**

2.1) Competencies

Granting competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

UEENEEE101A Apply Occupational Health and Safety regulations, codes and practices in the workplace

2.2) Further Information:

For the full prerequisite chain details for this unit please refer to Table 2 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

This unit contains Employability Skills

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Application of the Unit **4)**

4.1) General Application

This unit applies to competency development entry-level employment based programs incorporated in approved contracts of training.

4.2) Importation

RTOs wishing to import this unit into any qualification under the flexibility provisions of NQC Training Package Policy

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Elements and Performance Criteria Pre-Content

6) Elements describe
the essential outcomes
of a unit of competency

Elements and Performance Criteria

ELEMENT		PERFORMANCE CRITERIA	
1	Prepare to work on d.c. electrical circuits.	1.1	OHS procedures for a given work area are identified, obtained and understood.
		1.2	OHS risk control work preparation measures and procedures are followed.
		1.3	The nature of the circuit problem is obtained from documentation or from work supervisor to establish the scope of work to be undertaken.
		1.4	Advice is sought from the work supervisor to ensure the work is coordinated effectively with others.
		1.5	Sources of materials that may be required for the work are identified and accessed in accordance with established procedures.
		1.6	Tools, equipment and testing devices needed to carry out the work are obtained and checked for correct operation and safety.
2	Solve d.c. circuit problems.	2.1	OHS risk control work measures and procedures are followed.
		2.2	The need to test or measure live is determined in strict accordance with OHS requirements and when necessary conducted within established safety procedures.
		2.3	Circuits are checked as being isolated where necessary in strict accordance OHS requirements and procedures.
		2.4	Established methodological techniques are used to solve d.c. circuit problems from measure and calculated values as they apply to electrical circuit.

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ELEMENT	PERFORMANCE CRITERIA	
	2.5	Unexpected situations are dealt with safely and with the approval of an authorised person.
	2.6	Problems are solved without damage to apparatus, circuits, the surrounding environment or services and using sustainable energy practices.
3 Complete work and document problem solving activities.	3.1	OHS work completion risk control measures and procedures are followed.
	3.2	Work site is cleaned and made safe in accordance with established procedures.
	3.3	Justification for solutions used to solve circuit problems is documented.
	3.4	Work completion is documented and appropriate person(s) notified in accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of safe working practices and solving problems in d.c. circuits.

The knowledge and skills shall be contextualised to current industry standards, technologies and practices.

KS01-EE104A Direct current circuits

Evidence shall show an understanding of electrical fundamentals and direct current multiple path circuits to an extent indicated by the following aspects:

T1 Basic electrical concepts encompassing:

- electrotechnology industry
- static and current electricity
- production of electricity by renewable and non renewable energy sources
- transportation of electricity from the source to the load via the transmission and distribution systems

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REQUIRED SKILLS AND KNOWLEDGE

- utilisation of electricity by the various loads
- basic calculations involving quantity of electricity, velocity and speed with relationship to the generation and transportation of electricity.

T2 Basic electrical circuit encompassing:

- symbols used to represent an electrical energy source, a load, a switch and a circuit protection device in a circuit diagram
- purpose of each component in the circuit
- effects of an open-circuit, a closed-circuit and a short-circuit
- multiple and sub-multiple units

T3 Ohm's Law encompassing:

- basic d.c. single path circuit.
- voltage and currents levels in a basic d.c. single path circuit.
- effects of an open-circuit, a closed-circuit and a short-circuit on a basic d.c. single path relationship between voltage and current from measured values in a simple circuit
- determining voltage, current and resistance in a circuit given any two of these quantities
- graphical relationships of voltage, current and resistance
- relationship between voltage, current and resistance

T4 Electrical power encompassing:

- relationship between force, power, work and energy
- power dissipated in circuit from voltage, current and resistance values
- power ratings of devices
- measurement electrical power in a d.c. circuit
- effects of power rating of various resistors

T5 Effects of electrical current encompassing:

- physiological effects of current and the fundamental principles (listed in AS/NZS 3000) for protection against the this effect
- basic principles by which electric current can result in the production of heat; the production of magnetic fields; a chemical reaction
- typical uses of the effects of current
- mechanisms by which metals corrode
- fundamental principles (listed in AS/NZS3000) for protection against the damaging effects of current

T6 EMF sources energy sources and conversion electrical energy encompassing:

- basic principles of producing a emf from the interaction of a moving conductor in a magnetic field.
- basic principles of producing an emf from the heating of one junction of a thermocouple.

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REQUIRED SKILLS AND KNOWLEDGE

- basic principles of producing a emf by the application of sun light falling on the surface of photovoltaic cells
- basic principles of generating a emf when a mechanical force is applied to a crystal (piezo electric effect)
- principles of producing a electrical current from primary, secondary and fuel cells
- input, output, efficiency or losses of electrical systems and machines
- effect of losses in electrical wiring and machines
- principle of conservation of energy

T7 Resistors encompassing:

- features of fixed and variable resistor types and typical applications
- identification of fixed and variable resistors
- various types of fixed resistors used in the Electro technology Industry. e.g. wire-wound, carbon film, tapped resistors.
- various types of variable resistors used in the Electro technology Industry e.g. adjustable resistors: potentiometer and rheostat; light dependent resistor (LDR); voltage dependent resistor (VDR) and temperature dependent resistor (NTC, PTC).
- characteristics of temperature, voltage and light dependent resistors and typical applications of each
- power ratings of a resistor.
- power loss (heat) occurring in a conductor.
- resistance of a colour coded resistor from colour code tables and confirm the value by measurement.
- measurement of resistance of a range of variable' resistors under varying conditions of light, voltage, temperature conditions.
- specifying a resistor for a particular application.

T8 Series circuits encompassing:

- circuit diagram of a single-source d.c. 'series' circuit.
- Identification of the major components of a 'series' circuit: power supply; loads; connecting leads and switch
- applications where 'series' circuits are used in the Electro technology industry.
- characteristics of a 'series' circuit - connection of loads, current path, voltage drops, power dissipation and affects of an open circuit in a 'series' circuit.
- the voltage, current, resistances or power dissipated from measured or given values of any two of these quantities
- relationship between voltage drops and resistance in a simple voltage divider network.
- setting up and connecting a single-source series dc circuit
- measurement of resistance, voltage and current values in a single source series circuit
- effect of an open-circuit on a series connected circuit

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REQUIRED SKILLS AND KNOWLEDGE

T9 Parallel circuits encompassing:

- schematic diagram of a single-source d.c. ‘parallel’ circuit.
- major components of a ‘parallel’ circuit (power supply, loads, connecting leads and switch)
- applications where ‘parallel’ circuits are used in the Electrotechnology industry.
- characteristics of a ‘parallel’ circuit. (load connection, current paths, voltage drops, power dissipation, affects of an open circuit in a ‘parallel’ circuit).
- relationship between currents entering a junction and currents leaving a junction
- relationship between branch currents and resistances in a two branch current divider network.
- calculation of the total resistance of a ‘parallel’ circuit.
- calculation of the total current of a ‘parallel’ circuit.
- Calculation of the total voltage and the individual voltage drops of a ‘parallel’ circuit.
- setting up and connecting a single-source d.c. parallel circuit
- resistance, voltage and current measurements in a single-source parallel circuit
- voltage, current, resistance or power dissipated from measured values of any of these quantities
- output current and voltage levels of connecting cells in parallel.

T10 Series/parallel circuits encompassing:

- schematic diagram of a single-source d.c. ‘series/parallel’ circuit.
- major components of a ‘series/parallel’ circuit (power supply, loads, connecting leads and switch)
- applications where ‘series/parallel’ circuits are used in the Electrotechnology industry.
- characteristics of a ‘series/parallel’ circuit. (load connection, current paths, voltage drops, power dissipation, affects of an open circuit in a ‘series/parallel’ circuit).
- relationship between voltages, currents and resistances in a bridge network.
- calculation of the total resistance of a ‘series/parallel’ circuit.
- calculation of the total current of a ‘series/parallel’ circuit.
- calculation of the total voltage and the individual voltage drops of a ‘series/parallel’ circuit.
- setting up and connecting a single-source d.c. series/ parallel circuit
- resistance, voltage and current measurements in a single-source d.c. series / parallel circuit
- the voltage, current, resistances or power dissipated from measured values of any two of these quantities

T11 Factors affecting resistance encompassing:

- four factors that affect the resistance of a conductor (type of material, length, cross-sectional area and temperature)

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REQUIRED SKILLS AND KNOWLEDGE

- affect the change in the type of material (resistivity) has on the resistance of a conductor.
- affect the change in 'length' has on the resistance of a conductor.
- affect the change in 'cross-sectional area' has on the resistance of a conductor.
- effects of temperature change on the resistance of various conducting materials
- effects of resistance on the current-carrying capacity and voltage drop in cables.
- calculation of the resistance of a conductor from factors such as conductor length, cross-sectional area, resistivity and changes in temperature
- using digital and analogue ohmmeter to measure the change in resistance of different types of conductive materials (copper, aluminium, nichrome, tungsten) when those materials undergo a change in type of material length, cross-sectional area and temperature.

T12 Effects of meters in a circuit encompassing:

- selecting an appropriate meter in terms of units to be measured, range, loading effect and accuracy for a given application.
- measuring resistance using direct, volt-ammeter and bridge methods.
- instruments used in the field to measure voltage, current, resistance and insulation resistance and the typical circumstances in which they are used.
- hazards involved in using electrical instruments and the safety control measures that should be taken.
- operating characteristics of analogue and digital meters.
- correct techniques to read the scale of an analogue meters and how to reduce the 'parallax' error.
- types of voltmeters used in the Electrotechnology industry – bench type, clamp meter, Multimeter, etc.
- purpose and characteristics (internal resistance, range, loading effect and accuracy) of a voltmeter.
- types of voltage indicator testers. e.g. LED, neon, solenoid, volt-stick, series tester, etc. and explain the purpose of each voltage indicator tester.
- operation of various voltage indicator testers.
- advantages and disadvantages of each voltage indicator tester.
- various types of ammeters used in the Electrotechnology industry – bench, clamp meter, multimeter, etc.
- purpose of an ammeter and the correct connection (series) of an ammeter into a circuit.
- reasons why the internal resistance of an ammeter must be extremely low and the dangers and consequences of connecting an ammeter in parallel and/or wrong polarity.
- selecting an appropriate meter in terms of units to be measured, range, loading effect and accuracy for a given application
- connecting an analogue/digital voltmeter into a circuit ensuring the polarities are correct and take various voltage readings.

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- loading effect of various voltmeters when measuring voltage across various loads.
- using voltage indicator testers to detect the presence of various voltage levels.
- connecting analogue/digital ammeter into a circuit ensuring the polarities are correct and take various current readings.

T13 Resistance measurement encompassing:

- Identification of instruments used in the field to measure resistance (including insulation resistance) and the typical circumstances in which they are used.
- the purpose of an Insulation Resistance (IR) Tester.
- the parts and functions of various analogue and digital IR Tester (selector range switch, zero ohms adjustment, battery check function, scale and connecting leads).
- reasons why the supply must be isolated prior to using the IR tester.
- where and why the continuity test would be used in an electrical installation.
- where and why the insulation resistance test would be used in an electrical installation.
- the voltage ranges of an IR tester and where each range may be used. e.g. 250 V d.c, 500 V d.c and 1000 V d.c
- AS/NZS3000 Wiring Rules requirements – continuity test and insulation resistance (IR) test.
- purpose of regular IR tester calibration.
- the correct methods of storing the IR tester after use
- carry out a calibration check on a IR Tester
- measurement of low values of resistance using an IR tester continuity functions.
- measurement of high values of resistance using an IR tester insulation resistance function.
- volt-ammeter (short shunt and long shunt) methods of measuring resistance.
- calculation of resistance values using voltmeter and ammeter reading (long and short shunt connections)
- measurement of resistance using volt-ammeter methods

T14 Capacitors and Capacitance encompassing:

- basic construction of standard capacitor, highlighting the: plates, dielectric and connecting leads
- different types of dielectric material and each dielectric's relative permittivity.
- identification of various types of capacitors commonly used in the Electrotechnology industry (fixed value capacitors -stacked plate, rolled, electrolytic, ceramic, mica and Variable value capacitors – tuning and trimmer)
- circuit symbol of various types of capacitors: standard; variable, trimmer and polarised
- terms: Capacitance (C), Electric charge (Q) and Energy (W)
- unit of: Capacitance (Farad), Electric charge (Coulomb) and Energy (Joule)
- factors affecting capacitance (the effective area of the plates, the distance between the plates and the type of dielectric) and explain how these factors are present in all

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REQUIRED SKILLS AND KNOWLEDGE

circuits to some extent.

- how a capacitor is charged in a d.c. circuit.
- behaviour of a series d.c. circuit containing resistance and capacitance components. - charge and discharge curves
- the term 'Time Constant' and its relationship to the charging and discharging of a capacitor.
- calculation of quantities from given information: Capacitance (Q = VC); Energy (W =½CV2); Voltage (V = Q/C)
- calculation one time constant as well as the time taken to fully charge and discharge a given capacitor. (τ = RC)
- connection of a series d.c. circuit containing capacitance and resistor to determine the time constant of the circuit

T15 Capacitors in Series and Parallel encompassing:

- hazards involved in working with capacitance effects and the safety control measures that should be taken.
- safe handling and the correct methods of discharging various size capacitors
- dangers of a charged capacitor and the consequences of discharging a capacitor through a person
- factors which determine the capacitance of a capacitor and explain how these factors are present in all circuits to some extent.
- effects of capacitors connected in parallel by calculating their equivalent capacitance.
- effects on the total capacitance of capacitors connected in series by calculating their equivalent capacitance.
- Connecting capacitors in series and/or parallel configurations to achieve various capacitance values.
- common faults in capacitors.
- testing of capacitors to determine serviceability.
- application of capacitors in the Electrotechnology industry.

Evidence Guide

EVIDENCE GUIDE

9) The evidence guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

The Evidence Guide forms an integral part of this unit. It must be used in conjunction with all parts of the unit and performed in accordance with the Assessment Guidelines

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of this Training Package.

Overview of Assessment

9.1)

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the industry-preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accordance with industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Sources of evidence need to be 'rich' in nature to minimise error in judgment.

Activities associated with normal everyday work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all prerequisites must be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated performance criteria shall be demonstrated on at least two occasions in accordance with the 'Assessment Guidelines - UEE07'. Evidence shall also comprise:

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- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices, including the use of risk control measures as specified in the performance criteria and range statement
  - Apply sustainable energy principles and practices as specified in the performance criteria and range statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in this unit. It may be required by some jurisdictions that RTOs provide a percentile graded result for the purpose of regulatory or licensing requirements.
  - Demonstrate an appropriate level of skills enabling employment
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated consistent performance across a representative range of contexts from the prescribed items below:
  - Solving problems in d.c. circuits as described in 8) and including:

    A Using methodological techniques to solve d.c. circuit problems from measure and calculated values

    B Determining the operating parameters of an existing circuit.

    C Altering an existing circuit to comply with specified operating parameters.

    D Developing circuits to comply with a specified function and operating parameters.

    E Dealing with unplanned events

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and

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materials to undertake actual work as prescribed in this unit.

These should be used in the formal learning/assessment environment.

Note:

Where simulation is considered a suitable strategy for assessment, conditions for assessment must be authentic and as far as possible reproduce and replicate the workplace and be consistent with the approved industry simulation policy.

The resources used for assessment should reflect current industry practices in relation to solving problems in d.c. circuits.

Method of assessment

9.4)

This unit shall be assessed by methods given in Volume 1, Part 3 'Assessment Guidelines'.

Note:
Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no concurrent assessment recommendations for this unit.

Range Statement

RANGE STATEMENT

8) This relates to the unit as a whole providing the range of contexts and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

This unit shall be demonstrated in relation to single source series, parallel and series-parallel d.c. circuits as they apply to problems related to installation, fault finding, maintenance or development work functions and at least two of the following types of circuit problems and on more than one occasions:

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RANGE STATEMENT

- Determining the operating parameters of an existing circuit
- Altering an existing circuit to comply with specified operating parameters
- Developing circuits to comply with a specified function and operating parameters

Generic terms used throughout this Vocational Standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms that apply are given in Volume 2, Part 2.1.

Unit Sector(s)

Not Applicable

Competency Field

2.2) Literacy and numeracy skills

Participants are best equipped to achieve competency in this unit if they have reading, writing and numeracy skills indicated by the following scales. Description of each scale is given in Volume 2, Part 3 'Literacy and Numeracy'

Reading	3	Writing	3	Numeracy	3

2.2) Literacy and numeracy skills

Competency Field **5)**

Electrotechnology

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UEENEEE105A Fix and secure electrotechnology equipment

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This unit covers fixing, securing and mounting techniques as apply in the various electrotechnology work functions. It encompasses the safe use of hand and portable power tools, safe lifting techniques, safe use of ladders and elevated platforms and the selection and safe application of fixing devices and supporting accessories/equipment.

Application of the Unit

Not Applicable

Licensing/Regulatory Information

1.2) License to practice

During Training: Competency development activities are subject to regulations directly related to licencing, occupational health and safety and where applicable contracts of training such as apprenticeships.

In the workplace: The application of the skills and knowledge described in this unit require a license to practice in the workplace where work is carried out on electrical equipment or installations which are designed to operate at voltages greater than 50 V a.c. or 120 V d.c.

Other conditions may apply under State and Territory legislative and regulatory requirements.

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Pre-Requisites

Prerequisite Unit(s) **2)**

2.1) Competencies

Granting competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

UEENEEE101A Apply Occupational Health and Safety regulations, codes and practices in the workplace

2.2) Further Information:

For the full prerequisite chain details for this unit please refer to Table 2 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

This unit contains Employability Skills

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Application of the Unit **4)**

4.1) General Application

This unit applies to all qualifications, competencies and/or Skill Sets which require an electrical licence.

4.2) Importation

RTOs wishing to import this unit into any qualification under the flexibility provisions of NQC Training Package Policy

Elements and Performance Criteria Pre-Content

6) Elements describe

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the essential outcomes
of a unit of competency

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Prepare to fix and secure equipment.	1.1	OHS procedures for a given work area are identified, obtained and understood.
	1.2	OHS risk control work preparation measures and procedures are followed.
	1.3	The scope of work to be undertaken is obtained from documentation or from work supervisor.
	1.4	Advice is sought from the work supervisor to ensure the work is coordinated effectively with others.
	1.5	Sources of materials that may be required for the work are identified and accessed in accordance with established procedures.
	1.6	Fixing devices are selected for their suitable ability for the environment, the load they are to support and substratum's into which they are to be installed.
	1.7	Supporting accessories/equipment is selected for suitability for the environment and ability to support and protect from damage that which they are intended to support.
	1.8	Tools, equipment and testing devices needed to carry out the work are obtained and checked for correct operation and safety.
2 Install fixing and support devices.	2.1	Electrical isolation is arranged where work is within arm's reach of exposed conductive parts, plant or machinery in strict accordance OHS requirements and procedures.
	2.2	Other OHS risk control measures relevant to the work site are followed.
	2.3	Fixing devices are installed in accordance with manufacturer instructions.

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ELEMENT	PERFORMANCE CRITERIA	
	2.4	Support accessories/equipment is install accurately and to comply with technical standards and job specifications.
	2.5	Work is carried out efficiently without waste of materials or damage to apparatus, circuits, the surrounding environment or services and using sustainable energy principles.
3 Complete fixing and support work.	3.1	OHS risk control work completion measures and procedures are followed.
	3.2	Work site is tidied and tools and equipment cleaned and securely stored.
	3.3	Appropriate personnel are notified of the work completion.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of safe working practices and fixing and securing equipment.

The knowledge and skills shall be contextualised to current industry standards, technologies and practices.

KS01-EE105A Fixing and support devices/techniques

Evidence shall show an understanding of accessories and support and fixing device and methods and their use to an extent indicated by the following aspects:

T1. Device for securing and mounting electrical/electronic/instrumentation/refrigeration/ air-conditioning/telecommunications accessories for supporting, fixing and protecting wiring/cabling/piping and functional accessories to hollow walls encompassing:

- types and safe application of devices for hollow wall fixing and support
- methods/techniques used to fix/support to wood, hollow wall, masonry blocks, plasterboard, panelling
- types and safe application of fixing devices used in the electrotechnology industry for wood and hollow wall structures (wood screws, coach bolts, self-tappers, self

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drilling, metal thread, hollow wall anchors, behind plaster brackets, stud brackets, plasterboard devices, toggle devices)
- types of tools used for hollow wall fixing and supporting.
- using various fixing methods to fix/support to hollow walls.

T2. Device for securing and mounting electrical/electronic/instrumentation/refrigeration/ air-conditioning/telecommunications accessories for supporting, fixing and protecting wiring/cabling/piping and functional accessories to solid walls encompassing:

- types and safe application of devices used for solid wall fixing and support
- methods/techniques used in to fix to masonry and concrete structures
- fixing devices used in the electrotechnology industry for solid wall structures (wall-plugs, expanding concrete fixing devices, gas powered fixing tools, powder actuated fixing tools, loxins, dynabolts, chemical devices)
- regulatory requirements for use of powder fixing tools.
- hand and power tools used in fixing and supporting accessories
- using various fixing methods to fix/support to solid walls

T3. Device for securing and mounting electrical/electronic/instrumentation/refrigeration/ air-conditioning/telecommunications accessories for supporting, fixing and protecting wiring/cabling/piping and functional accessories to metal fixing encompassing:

- accessories that may be fixed to metal (saddle clips, conduits, brackets, switches)
- techniques for fixing to metal
- fixing devices: coach bolts, self-tappers, metal thread bolts, hollow wall anchors, rivets
- fixing tools - spanners, screwdrivers, power screw drivers, pop riveters, files, reamers
- OH&S issues related to drilling, cutting, eye protection, metal filings, swarf, noise
- Using power drills, drill bits, change drill speeds.
- Install a fixing device and accessory capable of supporting up to 20 kg on the metal plate.

T4. Securing and mounting electrical/electronic/instrumentation/refrigeration/ air-conditioning/telecommunications accessories for supporting, fixing and protecting wiring/cabling/piping and functional accessories using fixing adhesives and tapes encompassing:

- types and safe application of using adhesives and tapes as fixing devices (load limits of different commercial products)
- accessories that may be fixed using adhesives and tapes
- techniques for the application of adhesives and tapes
- tools used to apply and cut adhesives and tapes
- hazards and safety measures when working with adhesives and chemical fixing devices (fumes, cutting, eye protection, physical contact, hand protection,

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REQUIRED SKILLS AND KNOWLEDGE

ingestion)

Evidence Guide

EVIDENCE GUIDE

9) The evidence guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

The Evidence Guide forms an integral part of this unit. It must be used in conjunction with all parts of the unit and performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

9.1)

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the industry-preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accordance with industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Sources of evidence need to be 'rich' in nature to minimise error in judgment.

Activities associated with normal everyday work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same

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skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all prerequisites must be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated performance criteria shall be demonstrated on at least two occasions in accordance with the 'Assessment Guidelines - UEE07'. Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices, including the use of risk control measures as specified in the performance criteria and range statement
  - Apply sustainable energy principles and practices as specified in the performance criteria and range statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in this unit. It may be required by some jurisdictions that RTOs provide a percentile graded result for the purpose of regulatory or licensing requirements.
  - Demonstrate an appropriate level of skills enabling employment
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated consistent performance across a representative range of contexts from the prescribed items below:
  - Fix and secure electrical equipment as described in 8) and including:

    A Selecting fixing for loads of < 5 kg, < 20 kg and < 50 kg and suitable for the environment in which they are to be installed.

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B Installing fixing devices in compliance with manufacturers instructions

C Installing appropriate devices for fixing to a hollow wall, brick, concrete and steel.

D Installing fixing support accessories/equipment relevant the discipline in which competency is sought.

E Dealing with unplanned events

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed in this unit.

These should be used in the formal learning/assessment environment.

Note:

Where simulation is considered a suitable strategy for assessment, conditions for assessment must be authentic and as far as possible reproduce and replicate the workplace and be consistent with the approved industry simulation policy.

The resources used for assessment should reflect current industry practices in relation to fixing and securing electrical equipment.

Method of assessment

9.4)

This unit shall be assessed by methods given in Volume 1, Part 3 'Assessment Guidelines'.

Note:
Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent

9.5)

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assessment and relationship with other units	For optimisation of training and assessment effort, competency development in this unit may be arranged concurrently with units covering other installation competencies.

Range Statement

RANGE STATEMENT

8) This relates to the unit as a whole providing the range of contexts and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

This unit shall be demonstrated in relation to installation, fault finding, maintenance or development work functions in any of the following disciplines:

- Appliances
- Business equipment
- Computers
- Data Communications
- Electrical
- Electrical Machines
- Electronics
- Fire protection
- Instrumentation
- Refrigeration and Air Conditioning
- Renewable / sustainable energy, and
- Security technology

Generic terms used throughout this Vocational Standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms that apply are given in Volume 2, Part 2.1.

Unit Sector(s)

Not Applicable

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Competency Field

2.2) Literacy and numeracy skills

Participants are best equipped to achieve competency in this unit if they have reading, writing and numeracy skills indicated by the following scales. Description of each scale is given in Volume 2, Part 3 'Literacy and Numeracy'

Reading	3	Writing	3	Numeracy	3

2.2) Literacy and numeracy skills

Competency Field **5)**

Electrotechnology

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UEENEEE107A Use drawings, diagrams, schedules, standards, codes and specifications

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) **Descriptor**

This unit covers the use of drawings, diagrams, cable schedules, standards, codes and specifications as they apply to the various electrotechnology work functions. It encompasses the rudiments for communicating with schematic, wiring and mechanical diagrams and equipment and cable/connection schedules, manuals, site and architectural drawings and plans showing the location of services, apparatus, plant and machinery and understanding the use and format of compliance standards and job specifications.

Application of the Unit

Not Applicable

Licensing/Regulatory Information

1.2) **License to practice**

During Training: Competency development activities are subject to regulations directly related to licencing, occupational health and safety and where applicable contracts of training such as apprenticeships.

In the workplace: The application of the skills and knowledge described in this unit require a license to practice in the workplace where work is carried out on electrical equipment or installations which are designed to operate at voltages greater than 50 V a.c. or 120 V d.c.

Other conditions may apply under State and Territory legislative and regulatory requirements.

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Pre-Requisites

Prerequisite Unit(s) **2**)

2.1) **Competencies**

Granting competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

UEENEEE101A Apply Occupational Health and Safety regulations, codes and practices in the workplace

2.2) **Further Information**:

For the full prerequisite chain details for this unit please refer to Table 2 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3**)

This unit contains Employability Skills

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Application of the Unit **4**)

4.1) **General Application**

This unit applies to competency development entry-level employment based programs incorporated in approved contracts of training.

4.2) **Importation**

RTOs wishing to import this unit into any qualification under the flexibility provisions of NQC Training Package Policy

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Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a unit of competency

Elements and Performance Criteria

ELEMENT		PERFORMANCE CRITERIA	
1	Prepare to use drawings, diagrams, schedules and manuals.	1.1	Established OHS risk control measures and procedures are followed.
		1.2	The need for drawings, diagrams, schedules or manuals is determined from the nature of the work to be undertaken.
		1.3	Established routines and procedures are followed to obtain drawings, diagrams, schedules or manuals required for the work to be undertaken.
2	Use drawings, diagrams, schedules and manuals to obtain job information.	2.1	Drawings, diagrams, schedules and/or manuals are selected, appropriate to the work being undertaken.
		2.2	Drawings, diagrams and schedules are interpreted using knowledge of drawing layouts, conventions and symbols.
		2.3	Dimensions are extracted from drawings and diagrams for application to work undertaken.
		2.4	Location of equipment is determined from equipment schedules and location diagrams.
		2.5	Manuals are reviewed to ascertain their format and where information relevant to the work to be undertaken is located.
		2.6	Information given in manuals is interpreted in relation to the work to be undertaken.
3	Use drawings, diagrams, schedules and manuals to	3.1	Drawing conventions are used in neat freehand drawings to convey information and ideas to others involved in the work to be undertaken.

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ELEMENT	PERFORMANCE CRITERIA	
convey information and ideas.	3.2	Drawing conventions are used to neatly correct freehand original job drawing to show final 'as-installed' arrangement.
	3.3	Corrected drawings are forwarded to appropriate person(s) in accordance with established procedures.
4 Prepare to use compliance standards, codes and specifications.	4.1	Compliance Standards and Codes that apply to particular disciplines are sought and obtained.
	4.2	The format of compliance Standards and Codes that apply to particular disciplines are reviewed and understood.
	4.3	The purpose and format and typical content of job specifications are reviewed and understood.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of safe working practices and using drawings, diagrams, cable schedules, standards, codes and specifications.

The knowledge and skills shall be contextualised to current industry standards, technologies and practices.

KS01-EE107A Drawings, diagrams and schedules

Evidence shall show an understanding of drawings, diagrams and schedules used in electrotechnology work to an extent indicated by the following aspects:

T1 Architectural drawings encompassing:

- site plans, floor plans detailed drawings and standard drawings
- architectural floor plan to determine the power and lighting or communications / audio/ video layouts required in a domestic installation
- site plan to locate the service point, consumers mains, communication services, main switchboard, distribution boards and/or builders supplies.
- standard drawing scales to determine the actual lengths represented by dimensions on an architectural drawing.
- reading and interpretation of floor plans to determine the location of the electrical/

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REQUIRED SKILLS AND KNOWLEDGE

communication/audio accessories and appliances.

- Australian standard symbols used on floor plans to show the location of the accessories and appliances as detailed in an electrical schedule.

T2 Electrical drawings encompassing:

- types of electrical drawings: block, circuit, wiring and ladder diagrams
- purpose and application of block, circuit, wiring diagrams and ladder diagrams
- Australian standard symbols used to represent components on electrical diagrams.
- conventions used in and the features of circuit diagrams
- converting a circuit diagram to a wiring diagram
- identification of cable type, origin and route from a cable schedule.
- developing a cable schedule for a given installation.

T3 Circuit diagrams encompassing:

- purpose of circuit diagrams in the electrotechnology industry
- conventions used in and the features of circuit diagrams
- sketching basic circuit diagrams
- common symbols used in circuit diagram (Australian Drawing Standard AS/NZS 1102)
- developing switching charts to identify the terminals of various types of switches
- connecting equipment using circuit diagrams.

T4 Wiring diagrams encompassing:

- purpose of wiring diagrams in the electrotechnology industry
- conventions used in and the features of wiring diagrams
- sketching basic wiring diagrams
- common symbols used in wiring diagram (Australian Drawing Standard AS/NZS 1102)
- connecting equipment using wiring diagrams.

T5 Building construction drawings and diagrams encompassing:

- building types: timber frame, brick veneer, double brick and metal frame.
- identification of different types of: footings, floors, external walls, roofs, interior walls
- typical cable routes through buildings, structures and premises
- sequence of each constructional stage for brick, brick veneer and timber cottages
- identification of the stages at which the electrical/communications - first and second fixing occurs in the constructional sequence
- areas of cooperation between electrical/communications and other building trades

KS02-EE107A Introduction to regulations, compliance standards and codes

Evidence shall show an understanding of regulations, compliance standards and codes that apply to electrical work to an extent indicated by the following aspects:

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REQUIRED SKILLS AND KNOWLEDGE

T1 Regulation for undertaking electrical work encompassing:

- scope of work covered by licensing in the electrotechnology industry (Electrical licensing)
- legislative requirements for ensuring electrical or electronic equipment is safe i.e. compliance requirements of electrical installations

T2 Standards philosophy and format encompassing:

- performance verses prescriptive requirements
- purpose of technical standards and their development
- role of standards Australia/New Zealand, International Organisation for Standardisation (ISO) and the International Electrotechnical Commission (IEC)
- how standards are used in compulsory and accreditation compliance schemes.
- arrangement and use of technical standards in relation to electrical and electronic work
- how to read and apply a standard.
- Standards and codes that apply to all types of electrical installations
- Standards include Standards mandated under regulation (e.g. Wiring Rules) or by an authority, deemed-to-comply standard and local service requirements (e.g. Service rules).
- Codes include those applicable to electrical safe working practices and some aspects of the Building Code of Australia.

T3 Purpose, format and content of typical job specifications encompassing:

- NATSPEC specification system - provide the most common templates on which job specification are written.

Evidence Guide

EVIDENCE GUIDE

9) The evidence guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

The Evidence Guide forms an integral part of this unit. It must be used in conjunction with all parts of the unit and performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment	**9.1**) Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment

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EVIDENCE GUIDE

intervention. It is the industry-preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accordance with industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Sources of evidence need to be 'rich' in nature to minimise error in judgment.

Activities associated with normal everyday work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all prerequisites must be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated performance criteria shall be demonstrated on at least two occasions in accordance with the 'Assessment Guidelines - UEE07'. Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices, including the use of risk control measures as specified in the performance criteria and range statement
  - Apply sustainable energy principles and practices as

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EVIDENCE GUIDE

specified in the performance criteria and range statement

- Demonstrate an understanding of the essential knowledge and associated skills as described in this unit. It may be required by some jurisdictions that RTOs provide a percentile graded result for the purpose of regulatory or licensing requirements.
- Demonstrate an appropriate level of skills enabling employment
- Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures

- Demonstrated consistent performance across a representative range of contexts from the prescribed items below:
  - Use drawings, diagrams, schedules, standards, codes and specifications as described in 8) Range and including:

    A Identifying drawings, diagrams, schedules and manuals relevant to the work to be undertaken.

    B Interpreting drawings, diagrams, schedules and manuals correctly.

    C Using correct conventions in freehand drawings.

    D Giving correct information in freehand drawings.

    E Obtaining compliance Standards and Codes applicable to particular disciplines

    F Reviewing and understanding the format of compliance Standards and Codes that apply to particular disciplines

    G Reviewing the format and content of typical job specifications.

    H Dealing with unplanned events

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed in this unit.

These should be used in the formal learning/assessment

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EVIDENCE GUIDE

environment.

Note:

Where simulation is considered a suitable strategy for assessment, conditions for assessment must be authentic and as far as possible reproduce and replicate the workplace and be consistent with the approved industry simulation policy.

The resources used for assessment should reflect current industry practices in relation to using drawings, diagrams, schedules and manuals.

Method of assessment

9.4)

This unit shall be assessed by methods given in Volume 1, Part 3 'Assessment Guidelines'.

Note:
Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

For optimisation of training and assessment effort, competency development in this unit may be arranged concurrently with units covering the use of drawings, diagrams, schedules, standards, codes or specifications is required.

Range Statement

RANGE STATEMENT

8) This relates to the unit as a whole providing the range of contexts and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

This unit shall be demonstrated in relation to assembly, installation, fault finding, maintenance or development work functions in any of the following disciplines:

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RANGE STATEMENT

- Appliances
- Business equipment
- Computers
- Data Communications
- Electrical
- Electrical Machines
- Electronics
- Fire protection
- Instrumentation
- Refrigeration and Air Conditioning
- Renewable / sustainable energy, and
- Security technology

Generic terms used throughout this Vocational Standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms that apply are given in Volume 2, Part 2.1.

Unit Sector(s)

Not Applicable

Competency Field

2.2) Literacy and numeracy skills

Participants are best equipped to achieve competency in this unit if they have reading, writing and numeracy skills indicated by the following scales. Description of each scale is given in Volume 2, Part 3 'Literacy and Numeracy'

Reading	3	Writing	3	Numeracy	3

Custom Content Section

Competency Field **5)**

Electrotechnology

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UEENEEE117A Implement and monitor energy sector OHS policies and procedures

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit covers the mandatory requirements of persons in a supervisory role to implement and monitor an organisation's occupational health and safety policies, procedures and programs. It encompasses understanding an organisation's OHS obligations, providing safety information to staff, implementing and monitoring participative arrangements, safety procedures and training and maintaining safety records.

Application of the Unit

Application of the Unit **2)**

This unit addresses information, processes and techniques for the application of general occupational health and safety requirements in workplaces and is essential for employees work supervisory responsibilities. The unit is based on Generic Competency A in the National Guidelines for Integrating OHS Competencies into National Industry Competency Standards [NOHSC: 7025 (1998) 2nd Edition].

Note:
All States/Territories and the Commonwealth have enacted legislation that establishes a general duty of care for workplace parties to ensure healthy and safe working conditions. In most workplaces, the final responsibility for providing a healthy and safe working environment, as far as practicable, rests with the employer. Employees also have a duty of care in relation to OHS that ensures their health and safety and that of others in the

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workplace. The relevant jurisdictional OHS legislation should always be consulted to ascertain the exact duties set down for employers and employees.

Licensing/Regulatory Information

License to practice **3)**

The competency described in this unit does not directly require a license to practice but is subject to regulations for occupational health and safe and contracts of training where they apply.

Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

There are no prerequisite competencies for this unit.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve competency in this unit if they have reading, writing and numeracy skills indicated by the following scales. Description of each scale is given in Volume 2, Part 3 ‘Literacy and Numeracy’

Reading 5 Writing 5 Numeracy 5

Employability Skills Information

Employability Skills **5)**

This unit contains Employability Skills

The required outcomes described in this unit of competency contain applicable facets of Employability

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Employability Skills	**5)** Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Provide OHS information to the work group.	1.1 Relevant provisions of occupational health and safety legislation and codes of practice are accurately and clearly explained to the work group.
	1.2 Information on the organisation's occupational health and safety policies, procedures and programs is provided in a readily accessible manner and is accurately and clearly explained to the work group.
	1.3. Information about identified hazards and the outcomes of risk assessment and risk control procedures is regularly provided and is accurately and clearly explained to the work group.
2 Implement and monitor participative arrangements for the management of OHS.	2.1 Organisational procedures for consultation over occupational health and safety issues are implemented and monitored to ensure that all members of the work group have the opportunity to contribute.
	2.2 Issues raised through consultation are dealt with and resolved promptly or referred to the appropriate personnel for resolution in accordance with workplace procedures for issue

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ELEMENT	PERFORMANCE CRITERIA	
		resolution.
	2.3	The outcomes of consultation over occupational health and safety issues are made known to the work group promptly.
3. Implement and monitor the procedures for identifying hazards, assessing risk and controlling risks.	3.1	Existing and potential hazards in the work area are identified and reported so that risk assessment and risk control procedures can be applied.
	3.2	Work procedures to control risks are implemented and adherence to them by the work group is monitored in accordance with workplace procedures.
	3.3	Existing procedures to control risks are implemented and adherence to them by the work group is monitored in accordance with workplace procedures.
	3.4	Inadequacies in existing risk control measures are identified in accordance with the hierarchy of control and reported to designated personnel.
	3.5	Inadequacies in resource allocation for implementation of risk control measures identified and reported to designated personnel.
4 Implement the procedures for dealing with hazardous events.	4.1	Workplace procedures for dealing with hazardous events are implemented whenever necessary to ensure that prompt control action is taken.
	4.2	Hazardous events are investigated to identify their cause in accordance with investigation procedures.
	4.3	Control measures to prevent recurrence and minimise risks of hazardous events are implemented based on the hierarchy of control if within scope of responsibilities and competencies or alternatively referred to designated personnel for implementation.

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ELEMENT	PERFORMANCE CRITERIA
5 Implement and monitor the procedures for OHS training.	5.1 Occupational health and safety training needs are identified accurately, specifying gaps between occupational health and safety competencies required and those held by work group members.
	5.2 Arrangements are made for fulfilling identified occupational health and safety training needs in both on and off-the-job training programs in consultation with relevant parties.
6 Implement and monitor the procedures for maintaining OHS records.	6.1 Occupational health and safety records for work area are accurately and legibly completed in accordance with workplace requirements for occupational health and safety records and legal requirements for the maintenance of records of occupational injury and disease.
	6.2 Aggregate information from the area's occupational health and safety records is used to identify hazards and monitor risk control procedures within work according to organisational procedures and within scope of responsibilities and competencies.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of safe working practices and implementing and monitoring energy sector OHS policies and procedures

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

KS01-EE117A Energy sector Occupational Health and Safety, supervisory responsibilities

Evidence shall show an understanding of OHS enterprise responsibilities to an extent indicated by the following aspects:

T1 Provisions of relevant occupational health and safety legislation

T2 Principles and practice of effective occupational health and safety management

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REQUIRED SKILLS AND KNOWLEDGE

T3 Workplace hazards, range and selection of control measures

T4 Organisational health and safety management systems and policies and procedures needed for legislative compliance

T5 Impact of characteristics and composition of the workforce on occupational health and safety management

T6 Relevance of occupational health and safety management to other organisational management policies, procedures and systems.

T7 Analysis of entire work environment and judge occupational health and safety interventions

T8 Analysis of relevant workplace data

T9 Ability to assess resources needed for risk control.

Evidence Guide

EVIDENCE GUIDE

9) The evidence guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

The Evidence Guide forms an integral part of this unit. It must be used in conjunction with all parts of the unit and performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the industry-preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accordance with industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by

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various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Sources of evidence need to be 'rich' in nature to minimise error in judgment.

Activities associated with normal everyday work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all prerequisites must be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated performance criteria shall be demonstrated on at least two occasions in accordance with the 'Assessment Guidelines – UEE11'. Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices, including the use of risk control measures as specified in the performance criteria and range statement
  - Apply sustainable energy principles and practices as specified in the performance criteria and range statement
  - Demonstrate an understanding of the essential knowledge

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and associated skills as described in this unit. It may be required by some jurisdictions that RTOs provide a percentile graded result for the purpose of regulatory or licensing requirements.

- Demonstrate an appropriate level of skills enabling employment
- Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures

- Demonstrated consistent performance across a representative range of contexts from the prescribed items below:
  - Implement and monitor energy sector OHS policies and procedures as described in 8) and including:

A Providing OHS information to the work group.

B Implementing and monitoring participative arrangements for the management of OHS.

C Implementing and monitoring the procedures for identifying procedures for identifying hazards, assessing risks and controlling risks.

D Implementing the procedures for dealing with hazardous events.

E Implementing and monitoring the procedures for OHS.

F Implementing and monitoring the procedures for maintaining OHS records.

G Dealing with unplanned events by drawing on essential knowledge and skills to provide appropriate solutions incorporated in a holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials

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to undertake actual work as prescribed in this unit.

These should be used in the formal learning/assessment environment.

Note:

Where simulation is considered a suitable strategy for assessment, conditions for assessment must be authentic and as far as possible reproduce and replicate the workplace and be consistent with the approved industry simulation policy.

The resources used for assessment should reflect current industry practices in relation to implementing and monitoring energy sector OHS policies and procedures.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Volume 1, Part 3 'Assessment Guidelines'.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

For optimisation of training and assessment effort, competence in this unit may be assessed concurrently with other related units making up a qualification or possible skill clusters.

Components of this unit are included in the critical aspects of evidence of all units to help ensure the appropriate level of responsibility for safety has been acquired.

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Range Statement

RANGE STATEMENT

10) This relates to the unit as a whole providing the range of contexts and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

This unit shall be demonstrated in relation to implementing and monitoring energy sector OHS policies and procedures with the following attributes:

- organisation's OHS obligations
- safety information to staff
- participative arrangements implementation and monitoring
- safety procedures
- training
- safety records maintained

Implementing and monitoring the mandatory requirements of persons in a supervisory role an organisation's occupational health and safety policies, procedures and programs shall be demonstrated in the following:

- Relevant Occupational Health and Safety legislation, regulations and codes of practice related to hazards present in the industry and particular workplace
- Implementation of OHS and the specific safety procedures and work instructions for particular workplace

Generic terms used throughout this Vocational Standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms that apply are given in Volume 2, Part 2.1.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Electrotechnology

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UEENEEE124A Compile and produce an energy sector detailed report

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit covers complying and producing an energy sector report. It encompasses determining the safety requirements are met and all regulatory responsibilities are adhered to. The person competent in this unit must demonstrate an ability to identify information sources and collect and analyse and format information applicable to the electrotechnology industry and produce a report as required.

Application of the Unit

Application of the Unit **2)**

This competency standard is suitable for employment-based programs under an approved contract of training at the AQF level of the qualification in which the unit is first packaged or higher.

The unit may be selected as an elective from the relevant schedule (see qualification packaging rules) provided that all prerequisite units are undertaken or addressed through recognition processes.

This unit may be included in a skill set provided that it is listed in the schedule of electives (see Qualification Framework) and all prerequisite units are undertaken or addressed through recognition processes.

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Delivery and assessment of this unit should be undertaken within regard to the requirements of License to Practice (1.2 above), Prerequisite Competencies and Literacy and Numeracy skills (2 above) and the recommendations for concurrent assessment and relationship with other units (9.5 below).

Practice in the workplace and during training is also subject to regulations directly related to occupational health and safety and where applicable contracts of training such as apprenticeships.

Note:

1. Compliance with permits may be required in various jurisdictions and typically relates to the operation of plant, machinery and equipment such as elevating work platforms, powder operated fixing tools, power operated tools, vehicles, road signage and traffic control and lifting equipment. Permits may also be required for some work environments such as confined spaces, working aloft, near live electrical apparatus and site rehabilitation.

2. Compliance may be required in various jurisdictions relating to currency in First Aid, confined space, lifting, risk safety measures etc.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a license to practice in the workplace. However, practice in this unit is subject to regulations directly related to occupational health and safety and where applicable contracts of training such as apprenticeships.

Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

There are no prerequisite competencies for this unit.

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Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve competency in this unit if they have reading, writing and numeracy skills indicated by the following scales. Description of each scale is given in Volume 2, Part 3 'Literacy and Numeracy'

Reading 5 Writing 5 Numeracy 5

Employability Skills Information

Employability Skills **5)**

This unit contains Employability Skills

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare to develop a energy sector report.	1.1 OHS processes and procedures for a given work area are identified, obtained and understood.
	1.2 Established techniques for report writing are reviewed are adopted in accordance with

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ELEMENT		PERFORMANCE CRITERIA	
			organisation policies.
		1.3	The scope of the report is evaluated and report parameters established using a formal evaluation/survey processes.
		1.4	Criteria from other related works impacting on the report are determined from other sources.
		1.5	Identify source and availability of information.
2	Develop energy sector report.	2.1	Report is developed to include scenarios/requirements established in consultation with appropriate person(s), and regulatory requirements.
		2.2	Report is developed in collaboration with all relevant personnel.
		2.3	Competent persons are identified to assist in the compilation of the report.
		2.4	Report is reviewed against all inputs and adjusted to rectify any anomalies.
		2.5	Compile report in accordance with organisation policies and procedures.
		2.6	Compile and analyse research report information
3	Obtain approval for final energy sector report.	3.1	Report is presented and discussed with person(s) of higher authority.
		3.2	Alterations to the report resulting from the presentation/discussion are negotiated with person(s) of higher authority within the constraints of organisation policy.
		3.3	Final report is presented and approval obtained from appropriate person(s).

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

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REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of safe working practices and compiling and producing an electrotechnology report.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

KS01-EE124A Energy sector detailed report writing

Evidence shall show an understanding of analysis, decision making and reporting as they apply to engineering work functions to an extent indicated by the following aspects:

T1 Communicating with personnel encompassing:

- Oral communications
- Written procedures and work instructions

T2 Communicating with suppliers

T3 Communicating with customers

T4 Purpose and extent of maintaining work activities records in an enterprise encompassing:

- Types of records for maintaining work activities in an enterprise
- Methods for recording and maintaining work records
- Work records required by regulation requirements
- Using basic computer functions encompassing:
- Starting up
- Selecting application
- Entering information
- Saving
- Printing

T5 Techniques of analysis encompassing:

- use of appropriate sampling techniques to collect data.
- types of data and classification.
- effective questionnaire design
- data collection errors.
- frequency tables.
- statistical diagrams – drawing and interpretation.
- the general shape of a frequency distribution.
- different types of diagrams.
- mean time between failures calculations

T6 Summary of statistics encompassing:

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REQUIRED SKILLS AND KNOWLEDGE

- measures of central tendency
- measures of dispersion
- a 5-point summary for a given data set, box and whisker plot distribution
- data sets comparison using measures of centre and spread
- the effect of outliers on measures of centre and spread
- use computer programs or calculators to simplify calculations

T7 Correlation and regression encompassing:

- bivariate data and scatter diagrams.
- product-moment correlation coefficient calculation and interpretation.
- difference between causation and correlation.
- equations of regression lines from bivariate data with a calculator and line plotting on a scatter diagram.
- using the equation of regression to make predictions in practical situations.
- investigation of practical problems using correlation and regression.

T8 Investigation and reporting encompassing:

- presentation of a well formatted report with a clearly stated aim.
- using the internet to obtain relevant data.
- description of the statistical method and design chosen to meet the aim of the investigation.
- statistical analysis and results reporting.
- evaluation and interpretation of the results of the investigation.
- discussion of the investigation with reference to real world applications.
- chronology of the investigation.

Evidence Guide

EVIDENCE GUIDE

9) The evidence guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

The Evidence Guide forms an integral part of this unit. It must be used in conjunction with all parts of the unit and performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

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Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the industry-preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accordance with industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Sources of evidence need to be ‘rich’ in nature to minimise error in judgment.

Activities associated with normal everyday work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its ‘richness’. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

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Before the critical aspects of evidence are considered all prerequisites must be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated performance criteria shall be demonstrated on at least two occasions in accordance with the 'Assessment Guidelines – UEE11'. Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices, including the use of risk control measures as specified in the performance criteria and range statement
  - Apply sustainable energy principles and practices as specified in the performance criteria and range statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in this unit. It may be required by some jurisdictions that RTOs provide a percentile graded result for the purpose of regulatory or licensing requirements.
  - Demonstrate an appropriate level of skills enabling employment
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated consistent performance across a representative range of contexts from the prescribed items below:
  - Compile and produce an energy sector report as described in 8) and including:

A	Typical organisation policies and procedures.
B	Access to a report brief to established report parameters.
C	Access to appropriate person(s) to establish report requirements.
D	Establishing the scope and parameters of the report.
E	Determining the impact of other related works.
F	Developing design brief incorporating scenarios and all requirements.

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G	Appropriate computer application.
H	Identifying competencies required for the report.
I	Documenting report proposal.
J	Negotiating alterations to the proposed report successfully.

Note:
Successful completion of relevant vendor training may be used to contribute to evidence on which competency is deemed. In these cases the alignment of outcomes of vendor training with performance criteria and critical aspects of evidence shall be clearly identified.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed in this unit.

These should be used in the formal learning/assessment environment.

Note:

Where simulation is considered a suitable strategy for assessment, conditions for assessment must be authentic and as far as possible reproduce and replicate the workplace and be consistent with the approved industry simulation policy.

The resources used for assessment should reflect current industry practices in relation to compiling and producing an energy sector report.

Method of assessment

9.4)

This unit shall be assessed by methods given in Volume 1, Part 3

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'Assessment Guidelines'.

Note:
Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no concurrent assessment recommendations for this unit.

Range Statement

RANGE STATEMENT

10) This relates to the unit as a whole providing the range of contexts and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

This unit of competency describes work conducted by technical personnel who contribute to the conduct of energy sector report writing.

This unit of competency is typically performed by high-level technicians, working as part of a product/application/service research and/or design, development and implementation team. This generally involves working closely with a range of management and production/operations personnel and requires balancing the business and technical sides of the research process.

At this level, personnel should be able to interpret and explain sections/types of legislation, codes, regulations, Australian Standards and Intellectual Property rights that apply to the subject matter being reported upon. This unit of competency should be demonstrated in accordance with the organisations

- Occupational Health and Safety and Workplace Safety policies and procedures
- Goals, values, objectives, plans, systems and processes
- Business and performance plans
- Ethical standards
- Client service standards

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RANGE STATEMENT

- Quality and continuous improvement processes and standards
- Standard Operating Procedures
- Resources
- Technical standards
- Regulatory requirements

Generic terms used throughout this Vocational Standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms that apply are given in Volume 2, Part 2.1.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Electrotechnology

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UEENEEE137A Document and apply measures to control OHS risks associated with electrotechnology work

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This unit covers identifying occupational health and safety hazard and risks and documenting control measures. It encompasses identifying workplace hazards, assigning levels of risk, developing control measures to eliminate and/or mitigate risks, reviewing risk control measures and maintaining documentation of hazards, risk control measures and their application in accordance with compliance procedures.

Application of the Unit

Not Applicable

Licensing/Regulatory Information

1.2) License to practice

During Training: Competency development activities are subject to regulations directly related to licencing, occupational health and safety and where applicable contracts of training such as apprenticeships.

In the workplace: The application of the skills and knowledge described in this unit require a license to practice in the workplace where work is carried out on electrical equipment or installations which are designed to operate at voltages greater than 50 V a.c. or 120 V d.c.

Other conditions may apply under State and Territory legislative and regulatory requirements.

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Pre-Requisites

Prerequisite Unit(s) **2)**

2.1) Competencies

Granting competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

UEENEEE101A Apply Occupational Health and Safety regulations, codes and practices in the workplace

2.2) Further Information:

For the full prerequisite chain details for this unit please refer to Table 2 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

This unit contains Employability Skills

The required outcomes described in this competency standard unit contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this competency standard unit is packaged will assist in identifying Employability Skill requirements.

Application of the Unit **4)**

This unit addresses information, processes and techniques for the application of occupational health and safety specific to working with electrotechnology and is essential for employees without managerial or supervisory responsibilities

Elements and Performance Criteria Pre-Content

6) Elements describe

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the essential outcomes
of a unit of competency

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Identify and document hazards and risks.	1.1 Hazards are identified the appropriate persons involved and in accordance with compliance procedures. Note: Typically this will relate to such things as: The type of job, Electrical conditions, Energy levels, Radiation levels, Toxic substances, Airborne particles, Pressure discharge, Explosive atmosphere, Work-site location, General work-site conditions, Specific work location, Moving parts, Tools and equipment, Workers competence and/or capacity and/or personal effects
	1.2 Risks associated with identified hazards are determined in consultation with others and documented in accordance with compliance procedures.
	1.3 Provision is made to accommodate changes to documentation should unforseen hazards be identified.
2 Assign levels of risk and develop and document control measures.	2.1 Level of risk is assigned for each identified hazard in accordance with the regulations and following compliance procedures.
	2.2 Control measures are developed for hazard, level of risk and activity to eliminate and/or mitigate the risk following compliance procedures.
	2.3 Hazard, level of risk and control measures are agreed to and documented in consultation with all involved in accordance with compliance procedures.
3 Monitor and review the control measures.	3.1 Documented control measures are made available for reference by all involved with the work.
	3.2 Control measures are modified where required in consultation with all involved with the work in accordance with compliance procedures.
	3.3 Documentation of hazards, risk control measures and their application are filed in accordance with

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ELEMENT **PERFORMANCE CRITERIA**

compliance procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of safe working practices and documenting occupational hazards and risks in electrical.

The knowledge and skills shall be contextualised to current industry standards, technologies and practices.

KS01-EE137A **Risks and control measures for dealing with workplace hazards**

Evidence shall show an understanding of risks and control measures for dealing with workplace hazards to an extent indicated by the following aspects:

T1 Risk management and assessment of risk encompassing:

- Principle and purpose of risk management, and
- Processes for conducting a risk assessment
- Hazard identification by job analysis and work-site inspections
- Recording hazards and assessing the risk.

T2 Hazards and risks and control measures in working on construction sites encompassing:

- Hazards include manual and mechanical handling; working at heights; working in confined spaces; noise; dusts, gases, chemicals.

T3 Hazards associated with extra-low voltage, low-voltage and high-currents encompassing:

- Arrangement of power distribution and circuits in electrical installations
- Parts of an electrical system and equipment that operate at low-voltage and extra-low voltage,
- Parts of an electrical system and equipment where high-currents are likely.

T4 Hazards and risks and control measures associated with high-voltage encompassing:

- Parts of an electrical system and equipment that operate at high-voltage,
- The terms ‘touch voltage’, ‘step voltage’, ‘induced voltage’ and ‘creepage’ as they relate to the hazards of high-voltage
- Control measures used for dealing with the hazards of high-voltage.

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REQUIRED SKILLS AND KNOWLEDGE

T5 Hazards and risks and control measures in working with low voltage equipment encompassing:

- Risks in modifying electrical installations, fault finding, maintenance and repair.
- Control measures before, while and after working on electrical installations, circuits or equipment.
- Isolation and tagging-off procedures.
- Risks and restrictions in working live.
- Control measures for working live.

T6 Hazards and risks and control measures associated with harmful, devices, materials, gases, dusts and airborne contaminant encompassing:

- Harmful devices: gas touches, welding equipment, laser equipped devises and the like.
- Harmful materials: gases (refrigerants) and some industrial cleaning agents, fibres of optical cable, thermal insulation
- Harmful airborne contaminants: fibres of thermal insulation, fibres of optical cable, fibrous cement materials, asbestos and other fibres in insulation materials.

T7 Determine the degree of the risk encompassing:

- The three recognised levels of risk are:
  - High (potential to kill or permanent disability);
  - Medium (potential to cause an injury or illness of a permanent nature);
  - Low (potential to cause a cause minor injury requiring first aid but no permanent disability)

T8 Use control measures to eliminate or control the risk encompassing:

- Hierarchy of control measures are:
  - eliminate the risk by discontinuing the activity.
  - control the risk by redesigning the equipment
  - adopt administrative procedures
  - use of personal protective equipment.
- Control measures are formally documented in Job Safety Analysis (JSAs) or Safe Work Methods (SWMs).

T9 Engaging in monitoring and reviewing processes to ensure control measures remain valid.

Evidence Guide

EVIDENCE GUIDE

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EVIDENCE GUIDE

9) The evidence guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

The Evidence Guide forms an integral part of this unit. It must be used in conjunction with all parts of the unit and performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

9.**1**)

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the industry-preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accordance with industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Sources of evidence need to be 'rich' in nature to minimise error in judgment.

Activities associated with normal everyday work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate

9.**2**)

Before the critical aspects of evidence are considered all prerequisites must be met.

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EVIDENCE GUIDE

competency in this unit

Evidence for competence in this unit shall be considered holistically. Each element and associated performance criteria shall be demonstrated on at least two occasions in accordance with the 'Assessment Guidelines - UEE07'. Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices, including the use of risk control measures as specified in the performance criteria and range statement
  - Apply sustainable energy principles and practices as specified in the performance criteria and range statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in this unit. It may be required by some jurisdictions that RTOs provide a percentile graded result for the purpose of regulatory or licensing requirements.
  - Demonstrate an appropriate level of skills enabling employment
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated consistent performance across a representative range of contexts from the prescribed items below:
  - Document and applying measure to control occupational health and safety risks in electrotechnology work as described in 8) and including:

    A Identifying with appropriate person and in accordance with compliance procedures.

    B Determining the risk associated with identified hazards

    C Assigning the risks and developing and documenting control measures.

    D Reviewing and modifying control measures where required.

    E Recording activities.

    F Dealing with unplanned events

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EVIDENCE GUIDE

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed in this unit.

These should be used in the formal learning/assessment environment.

Note:

Where simulation is considered a suitable strategy for assessment, conditions for assessment must be authentic and as far as possible reproduce and replicate the workplace and be consistent with the approved industry simulation policy.

The resources used for assessment should reflect current industry practices in relation to documenting occupational hazards and risks in electrical.

Method of assessment

9.4)

This unit shall be assessed by methods given in Volume 1, Part 3 'Assessment Guidelines'.

Note:
Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

For optimisation of training and assessment effort, competence in this unit may be assessed concurrently with other related units making up a qualification or possible skill clusters.

Components of this unit are also included in the critical aspects of evidence of all units to help ensure the appropriate level of responsibility for safety has been acquired.

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Range Statement

RANGE STATEMENT

8) This relates to the unit as a whole providing the range of contexts and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

This unit shall be demonstrated in relation to electrotechnology work functions, including but limited to: installation, testing, inspection, fault finding, maintenance or development work functions covering:

- Relevant occupational health and safety legislation, regulations and codes of practice related to devices and systems and hazards present in residential, commercial and industrial workplaces.
- Accepted industry work procedures and the specific safety procedures and work instructions for a particular workplace or organistaion.

In any of the following disciplines:

- Appliances
- Business equipment
- Computers
- Data Communications
- Electrical
- Electrical Machines
- Electronics
- Fire protection
- Instrumentation and Control
- Refrigeration and Air Conditioning
- Renewable / sustainable energy
- Security technology
- Energy Supply, Transmission and Distribution Networks

Generic terms used throughout this Vocational Standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms that apply are given in Volume 2, Part 2.1.

Unit Sector(s)

Not Applicable

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Competency Field

2.2) Literacy and numeracy skills

Participants are best equipped to achieve competency in this unit if they have reading, writing and numeracy skills indicated by the following scales. Description of each scale is given in Volume 2, Part 3 'Literacy and Numeracy'

Reading	3	Writing	3	Numeracy	3

Custom Content Section

Competency Field **5**)

Electrotechnology

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UEENEEE185A Write work activity reports

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit covers writing reports related to installation, fault finding, servicing/maintenance and safety in an energy sector discipline. It encompasses a relevant level of understanding of the energy sector discipline subject to the reports, gathering relevant information from appropriate sources; make deductions from the information obtained, arranging reports in a logical sequence and writing in clear English.

Application of the Unit

Application of the Unit **2)**

This competency standard is suitable for employment-based programs under an approved contract of training at the AQF level of the qualification in which the unit is first packaged or higher.

The unit may be selected as an elective from the relevant schedule (see qualification packaging rules) provided that all prerequisite units are undertaken or addressed through recognition processes.

This unit may be included in a skill set provided that it is listed in the schedule of electives (see Qualification Framework) and all prerequisite units are undertaken or addressed through recognition processes.

Delivery and assessment of this unit should be

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undertaken within regard to the requirements of License to Practice (1.2 above), Prerequisite Competencies and Literacy and Numeracy skills (2 above) and the recommendations for concurrent assessment and relationship with other units (9.5 below).

Practice in the workplace and during training is also subject to regulations directly related to occupational health and safety and where applicable contracts of training such as apprenticeships.

Note:

1. Compliance with permits may be required in various jurisdictions and typically relates to the operation of plant, machinery and equipment such as elevating work platforms, powder operated fixing tools, power operated tools, vehicles, road signage and traffic control and lifting equipment. Permits may also be required for some work environments such as confined spaces, working aloft, near live electrical apparatus and site rehabilitation.

2. Compliance may be required in various jurisdictions relating to currency in First Aid, confined space, lifting, risk safety measures etc.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a license to practice in the workplace. However, practice in this unit is subject to regulations directly related to occupational health and safety and where applicable contracts of training such as apprenticeships.

Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

There are no prerequisite competencies for this unit.

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Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve competency in this unit if they have reading, writing and numeracy skills indicated by the following scales. Description of each scale is given in Volume 2, Part 3 'Literacy and Numeracy'

Reading 5 Writing 5 Numeracy 5

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare to develop a report.	1.1 The need for a report is determined from particular circumstances and /or request in accordance with established procedures
	1.2 The purpose and scope of the report is ascertained from the particular circumstances and /or request in accordance with established

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ELEMENT	PERFORMANCE CRITERIA	
		procedures.
	1.3	OHS processes and procedures for a given work area are identified, obtained and understood.
	1.4	Sources of information needed for the report are identified and obtained in consultation with appropriate persons and in accordance with established procedures.
2 Write report.	2.1	Report is developed in consultation with appropriate persons.
	2.2	Report is developed to include all relevant information obtained
	2.3	Information in the report is arranged in a logical sequence including deductions recommendations where appropriate.
	2.4	Report is written in clear English and in accordance with organisation policies and procedures.
3 Obtain approval for final report.	3.1	Report is presented and discussed with person(s) of higher authority.
	3.2	Alterations to the report resulting from the presentation/discussion are negotiated with person(s) of higher authority within the constraints of organisation policy.
	3.3	Final report is presented and approval obtained from appropriate person(s).

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of safe working practices and writing a work activity report.

All knowledge and skills detailed in this unit should be contextualised to current

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REQUIRED SKILLS AND KNOWLEDGE

industry practices and technologies.

KS01-EG185A Work activity reporting

Evidence shall show an understanding of work activity reporting to an extent indicated by the following aspects:

T1 Scope of work activity reports encompassing:

- Installation, fault finding/repair, servicing/maintenance and safety work activities.
- Reports in response to an enquiry, situation, investigation, problem and incident.

T2 Sources of information

- Examples include (but not limited to) work colleagues, customer/client personnel, standards, specifications and direct experience of the enquiry, situation, investigation, problem or incident that is subject of the report

T3 Structure of reports encompassing:

- The description and/or explanation of the subject matter in logical sequence of facts
- Arrangement of content

T4 Clear English writing techniques

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the unit. It must be read in conjunction with the performance criteria and the range statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this unit. It must be used in conjunction with all parts of the unit and performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the industry-preferred model for apprenticeships. However, where summative (or final) assessment is used it is to

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include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accordance with industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Sources of evidence need to be 'rich' in nature to minimise error in judgment.

Activities associated with normal everyday work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all prerequisites must be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated performance criteria shall be demonstrated on at least two occasions in accordance with the 'Assessment Guidelines – UEE11'. Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:

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- Implement Occupational Health and Safety workplace procedures and practices, including the use of risk control measures as specified in the performance criteria and range statement
- Apply sustainable energy principles and practices as specified in the performance criteria and range statement
- Demonstrate an understanding of the essential knowledge and associated skills as described in this unit. It may be required by some jurisdictions that RTOs provide a percentile graded result for the purpose of regulatory or licensing requirements.
- Demonstrate an appropriate level of skills enabling employment
- Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures

- Demonstrated consistent performance across a representative range of contexts from the prescribed items below:
  - Compile and produce an electrotechnology report as described in 8) and including:

A	Determining the need for a report
B	Ascertaining the purpose and scope of a report
C	Sources and obtain information relevant to a report
D	Including all relevant information
E	Arranging reports in a logical sequence
F	Writing reports in plain English
G	Obtaining approval for the report
H	Dealing with unplanned events

Note:
Successful completion of relevant vendor training may be used to contribute to evidence on which competency is deemed. In these cases the alignment of outcomes of vendor training with performance criteria and critical aspects of evidence shall be clearly identified.

Context of and specific resources for **9.3)**

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assessment

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed in this unit.

These should be used in the formal learning/assessment environment.

Note:

Where simulation is considered a suitable strategy for assessment, conditions for assessment must be authentic and as far as possible reproduce and replicate the workplace and be consistent with the approved industry simulation policy.

The resources used for assessment should reflect current industry practices in relation to compiling and producing an electrotechnology report.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Volume 1, Part 3 ‘Assessment Guidelines’.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

There are no concurrent assessment recommendations for this unit.

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Range Statement

RANGE STATEMENT

10) This relates to the unit as a whole providing the range of contexts and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

This unit shall be demonstrated in relation to writing reports in response to at least three of the following:

- an enquiry,
- a situation,
- an investigation,
- a problem or
- an incident

Each in relation to a different one of the following work activities:

- installation,
- fault finding/repair,
- servicing/maintenance or
- safety

Generic terms used throughout this Vocational Standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms that apply are given in Volume 2, Part 2.1.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Electrotechnology

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UEENEEF102A Install and maintain cabling for multiple access to telecommunication services

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit covers the installation and maintenance of telecommunications cabling in buildings and premises. It encompasses working safely and to Australian Communications and Media Authority's 'Open' Cabling Provider Rule, installing multiple telephone line, multi-pair cables, backbone cabling, terminating in socket outlets, termination modules and distributors, testing and compliance checks and completing cabling documentation.

Application of the Unit

Application of the Unit **2)**

This unit applies to customer cabling terminated on distributors and to the installation, maintenance and modification of indoor, external, underground cabling Customer cabling, for the purpose of this standard, may be used to connect devices for a range of applications, including for example: telecommunications (phones and facsimile), data including video and multimedia, security and alarms, and fire protection.

Licensing/Regulatory Information

License to practice **3)**

This unit meets the minimum ACMA 'prescribed level of

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License to practice **3)**

knowledge and skill that safeguards matters of health, safety, network integrity and addresses matters of interoperability where customer equipment and standard telephone service are involved'. Therefore, skills and knowledge described in this unit may only be practised under the requirements set out in ACMA 'Open' Cabling Provider Rule.

Practice of this competency standard unit is also subject to regulations directly related to occupational health and safe and contracts of training where they apply.

Note:

1. Compliance with permits may be required in various jurisdictions and typically relates to the operation of plant, machinery and equipment such as elevating work platforms, powder operated fixing tools, power operated tools, vehicles, road signage and traffic control and lifting equipment. Permits may also be required for some work environments such as confined spaces, working aloft, near live electrical apparatus and site rehabilitation.

2. Compliance may be required in various jurisdictions relating to currency in First Aid, confined space, lifting and risk safety measures.

Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

UEENEEE101A	Apply Occupational Health and Safety regulations, codes and practices in the workplace
UEENEEE102A	Fabricate, assemble and dismantle utilities industry components
UEENEEE104A	Solve problems in d.c. circuits

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Prerequisite Unit(s) **4)**

UEENEEE105A	Fix and secure electrotechnology equipment
UEENEEE107A	Use drawings, diagrams, schedules, standards, codes and specifications

For the full prerequisite chain details for this unit please refer to Table 2 in Volume 1, Part 2

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve competency in this unit if they have reading, writing and numeracy skills indicated by the following scales. Description of each scale is given in Volume 2, Part 3 'Literacy and Numeracy'

Reading	3	Writing	3	Numeracy	3

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare to install and maintain cabling.	1.1 OHS procedures for a given work area are identified, obtained and understood through established routines and procedures.
	1.2 Health and safety risks are identified and established risk control measures and procedures are followed in preparation for the work.
	1.3 Remote power feeding is identified and established risk control measures prepared.
	1.4 The nature and location of the work is determined from documentation or in discussion with appropriate person(s) to establish the scope of work to be undertaken.
	1.5 Cable routes are planned within the constraints of the building structure, significants and regulations.
	1.6 Earthing requirements are determined with consideration of existing earthing arrangements, where applicable and of cable system earth upper and lower resistance limitations.
	1.7 Advice is sought from appropriate persons to ensure the work is coordinated effectively with others.
	1.8 Sources of materials that may be required for the work are established in accordance with established routines and procedures.
	1.9 Tools, equipment and testing devices needed to carry out the work are obtained and checked for correct operation and safety.
2 Install and maintain cabling.	2.1 Established OHS risk control measures and procedures for carrying out the work are followed.
	2.2 Installed support structure is checked to ensure cable will not be exposed to damage during installation and general operation.
	2.3 Catenary supports are secured to building structure and tensioned where necessary to ensure cable weight can be carried in operating conditions with interference and safety segregation maintained including adherence to

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ELEMENT	PERFORMANCE CRITERIA	
		AS/ACIF S009.
	2.4	Protective earthing of metal work is installed in accordance with requirements and to industry standards.
	2.5	Cables/wires are handled in accordance with manufacturer's application specifications including tension and bending stress requirements.
	2.6	Sufficient excess is allowed at cable ends to facilitate termination.
	2.7	Telecommunication outlet ends of cable are uniquely labelled to match identifier at originating location.
	2.8	Cable is placed and secured to maintain safety and interference segregation in accordance with legislative and industry standards.
	2.9	Cable ties not tightened to the point of causing cable sheath damage or transmission impairment are trimmed flush to prevent risk of personal damage.
	2.10	Cables installed as catenaries or supported by catenaries in external environment shall meet minimum above ground clearances and clearances from hazardous electrical services as per AS/ACIF S009.
	2.11	Cables installed underground shall meet minimum depth of cover and segregation from hazardous electrical and other services as per AS/ACIF S009.
	2.12	Over-voltage protection devices are fitted to all cable pairs, where required, to suppress voltage surges with the devices protectively earthed in accordance with AS/ACIF S009.
	2.13	TRC/CES/Earth wire insulation is protected against damage and TRC/CES and protective earths segregated in accordance with relevant industry and legislative standards AS/ACIF S009.
	2.14	Procedures for referring non-routine events to immediate supervisor for directions are followed.

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ELEMENT	PERFORMANCE CRITERIA	
	2.15	Cabling is installed efficiently without waste of materials and energy or damage to apparatus, the surrounding environment or services.
	2.16	Routine quality checks are carried out to ensure cabling complies with requirements.
3. Terminate and test cables and earth wires.	3.1	Established OHS risk control measures and procedures for carrying out the work are followed.
	3.2	Cable sheath removed to allow for correct termination length and without damage to underlying conductors and their insulation.
	3.3	Terminating modules are installed in accordance to manufacturer specifications and cable pairs neatly and sequentially fanned for termination.
	3.4	Conductors are terminated in accordance with recommended colour code sequence using appropriate termination tools in the manufacturer's specified manner.
	3.5	Cable shield (if applicable) is earthed to manufacturer specifications and relevant industry codes of practice including AS/ACIF S009.
	3.6	Visual inspection is undertaken to confirm termination colour code sequence has been followed prior to end-to-end testing of wire and pair termination integrity.
	3.7	Cable pairs are tested and clearly labelled to provide an accurate identification in accordance with requirements.
	3.8	TRC/CES/Earth wires are terminated with connectors recommended by manufacturers in accordance with relevant industry codes of practice including AS/ACIF S009.
	3.9	TRC/CES /Earth wire continuity is maintained through out and interface requirements with electrical systems are observed.
	3.10	TRC/CES /Earthing installation is tested for continuity, insulation resistance and conductive

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ELEMENT	PERFORMANCE CRITERIA	
		resistance as per relevant industry standards including AS/ACIF S009.
	3.11	Earthing system is labelled in accordance with requirements.
	3.12	Compatibility of alterations with existing systems is confirmed and new work tested both in isolation and when integrated with existing systems.
	3.13	Procedures for referring non-routine events to immediate supervisor for directions are followed.
	3.14	Cabling is terminated efficiently without waste of materials and energy or damage to apparatus, the surrounding environment or services.
	3.15	Routine quality checks are carried out and a defect rectified to ensure cabling complies with requirements.
4 Complete cabling work, records and reporting.	4.1	OHS work completion risk control measures and procedures are followed.
	4.2	Work site is cleaned and made safe in accordance with established procedures.
	4.3	Record sheets and plans of cable location, type and infrastructure are accurately created or updated and stored in accordance with customer requirements.
	4.4	Cable pair record books are created or updated to provide an accurate record of pair locations, inter-connections and usage in accordance with industry codes of practice and AS/ACIF S009.
	4.5	Cabling completion advice is documented and reported in accordance with requirements.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of safe working practices and

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REQUIRED SKILLS AND KNOWLEDGE

laying and connecting cables for multiple access to telecommunication services.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

KS01-EF102A Telecommunications telephony and switching

Evidence shall show an understanding of telecommunications telephony and switching, applying safe working practices and relevant Standards, Codes and Regulations to an extent indicated by the following aspects:

T1. Principles and characteristics of sound encompassing:

- Sound characteristics
- Sound waves
- Distortion
- Attenuation
- Resonant frequency
- Sound pressure levels

T2. Transmission of sound encompassing:

- Compression
- Rarefaction
- Sound transmission
- Wavelength
- Inverse square rule (attenuation)
- Basic telephone construction

T3. Telephone transmitters encompassing:

- Telephone transmitter functions
- Telephone transmitter types
- Capacitive transmitters
- Moving coil transmitters

T4. Telephone receivers encompassing:

- Telephone receiver functions
- Telephone receiver types

T5. Telephone circuits encompassing:

- Components
- Operation of basic telephone
- Operation of basic facsimile machine
- Cables used, colour and termination types

T6. Overview of earthing and protection encompassing:

- Function of earthing
- Earthing requirements

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REQUIRED SKILLS AND KNOWLEDGE

T7. Customer switching systems (CSS), interfaces and devices encompassing:

- System Distribution Frames (SDF)
- Power fail and line interface requirements (e.g. Indial, ISDN, Rotary Groups, Extension, Tie-line circuits and the like)

T8. Installation of CSS encompassing:

- Documentation
- CPR rules
- CSS interfaces
- CPR rules for SDFs

T9. Installation and termination requirements overview encompassing:

- ACMA regulations and requirements
- Technical standards
- Programming of CSS
- Metering and Public/Pay Phones

T10. Hazards encompassing:

- Electronic components and circuits
- Printed circuit boards
- Physical
- Static discharge
- Chemical

KS02-EF102A Telecommunications Open CPR regulations

Evidence shall show an understanding of telecommunications Open CPR regulations, applying safe working practices and relevant Standards, Codes and Regulations to an extent indicated by the following aspects:

T1 Cabling provider rules encompassing:

- Cabling registrars, auditors and inspectors
- Mandatory and voluntary requirements for cabling work
- Registration

T2 General installation requirements encompassing:

- Cabling provider rules requirements
- Earth potential rise
- Catenary cabling systems
- Optical fibre and coaxial cabling systems
- Conduits
- Surge suppression devices
- T3 Cable distribution devices encompassing:
- Cable distribution devices

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REQUIRED SKILLS AND KNOWLEDGE

- Clearances
- General requirement
- T4 Indoor cabling encompassing:
- General requirements for indoor cabling
- Required minimum clearances
- Damp situations
- Cables in lift and hoist shafts
- T5 Underground cabling encompassing:
- Requirements for underground cabling
- Protection of underground cabling
- Segregation from other services
- T6 Aerial cabling encompassing:
- Requirements for aerial cabling
- Minimum clearances
- Segregation requirements
- T7 Earthing encompassing:
- Earthing systems
- Earthing of equipment
- Equipotential bonding
- T8 Miscellaneous regulations encompassing:
- Cabling in heritage buildings
- Cabling in public places
- Cabling in hazardous areas

KS03-EF102A Telecommunications installation practices

Evidence shall show an understanding of telecommunications installation and maintenance practices, applying safe working practices and relevant Standards, Codes and Regulations to an extent indicated by the following aspects:

T1 Telecommunication cable types encompassing:

- Construction
- Characteristics
- Applications

T2 Cable identification encompassing:

- Plans and drawing
- Labelling
- Documentation

T3 Building structures, materials and sequencing encompassing:

- Building types
- Timber frame
- Brick veneer

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REQUIRED SKILLS AND KNOWLEDGE

- Double brick
- Metal frame
- Parts of a building
- Sequence of construction
- Stages of construction where electrical work is completed
- Environmental and heritage awareness purpose and regulations

T4 Cable installation encompassing:

- Hazards
- Cable damage prevention
- Cable dispensers
- Cable enclosures
- Types
- Fixing
- Regulations
- Distribution boxes and back mounts
- Systems

T5 Termination Boundaries and devices encompassing:

- Electrical connections
- Hazards
- Regulations

T6 Cable preparation and terminations and hauling mechanisms encompassing:

- Indoor Methods
- Outdoor Methods

T7 Earthing concepts encompassing:

- MEN System
- Communication Earthing System
- Telecommunication Reference Conductor
- Earthing Cable Shield
- Testing
- Earth Barriers
- Purpose of earth testing instruments
- Earth Potential Rise
- Earthing test procedures
- Interpretation of results

T8 Surge suppression and system encompassing:

- Purpose
- Types
- Operation

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REQUIRED SKILLS AND KNOWLEDGE

- Installation Techniques
- Earthing requirements

T9 Cable shielding and interference encompassing:

- EMI/RFI Principles
- Sources
- Reduction Techniques
- Earthing Cable Shields

T10 Telecommunication earthing systems encompassing:

- Hazards
- Solutions
- Installation
- Termination
- Line taps
- Testing

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the unit and must be read in conjunction with the performance criteria and the range statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this unit. It must be used in conjunction with all parts of the unit and performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the industry-preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside

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the workplace. However, it must be in accordance with industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Sources of evidence need to be 'rich' in nature to minimise error in judgment.

Activities associated with normal everyday work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all prerequisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated performance criteria shall be demonstrated on at least two occasions in accordance with the 'Assessment Guidelines – UEE11'. Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices, including the use of risk control measures as specified in the performance criteria and range statement

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- Apply sustainable energy principles and practices as specified in the performance criteria and range statement
- Demonstrate an understanding of the essential knowledge and associated skills as described in this unit. It may be required by some jurisdictions that RTOs provide a percentile graded result for the purpose of regulatory or licensing requirements.
- Demonstrate an appropriate level of skills enabling employment
- Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures

- Demonstrated consistent performance across a representative range of contexts from the prescribed items below:
  - Lay and connect cables for multiple access to telecommunication services as described in 8) and including:

A	Terminating systems at both distributor and outlet locations and at least one 50 pair copper cable, with accurate completion of installation records, drawing alterations and compliance forms
B	Placing of cables on support structures and building faces for both internal and external locations
C	Securing cables correctly for above locations
D	Avoiding cable damage such as crushing, burning, kinking, sheath twist, cutting and nicking, bending radius
E	Reading and interpreting drawings related to cable layouts, outlet location, cable coding system and identifiers, distributor locations
F	Conducting and interpreting cable test results
G	Correctly interpreting and applying standards and regulations
H	Completing the required documentation
I	Dealing with unplanned events by drawing on essential knowledge and skills to provide appropriate solutions incorporated in a holistic assessment with the above listed items

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Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

These should be used in the formal learning/assessment environment.

Note:

Where simulation is considered a suitable strategy for assessment, conditions must be authentic and as far as possible reproduce and replicate the workplace and be consistent with the approved industry simulation policy.

The resources used for assessment should reflect current industry practices in relation to laying and connecting cables for multiple access to telecommunication services.

Method of assessment

9.4)

This unit shall be assessed by methods given in Volume 1, Part 3 ‘Assessment Guidelines’.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this competency standard unit applies. This requires assessment in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

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For optimisation of training and assessment effort, competency development in this unit may be arranged concurrently with unit:

UEENEEE105A	Fix and secure electrotechnology equipment
UEENEEE107A	Use drawings, diagrams, schedules, standards, codes and specifications

Range Statement

RANGE STATEMENT

10) This relates to the unit as a whole providing the range of contexts and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

This unit shall be demonstrated in relation to cable laying and connecting applicable to larger commercial and industry installations involving many lines, multi-pair cables, backbone cabling, multi-story buildings and more complicated termination modules and distributors.

Generic terms used throughout this Vocational Standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms that apply are given in Volume 2, Part 2.1.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Data and Voice Communications

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UEENEEF104A Install and modify performance data communication copper cabling

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit covers the installation and termination of high performance data copper cabling in buildings and premises and intended for connection a telecommunications network. It encompasses working safely and to standards, installing multiple data lines and backbones using structured twisted pair cabling, terminating at distributors, termination modules and in socket outlets, testing and compliance checks and completing cabling documentation.

Application of the Unit

Application of the Unit **2)**

This unit is intended for competency development in entry-level employment based programs incorporated in approved contracts of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit require a registration to practise in the workplace subject to requirements set out ACMA ‘Open’ Cabling Provider Rule. Practice in workplace and during training is also subject to regulations directly related to occupational health and safety and where applicable contracts of

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License to practice **3)**

training such as apprenticeships.

Note:

1. Compliance with permits may be required in various jurisdictions and typically relates to the operation of plant, machinery and equipment such as elevating work platforms, powder operated fixing tools, power operated tools, vehicles, road signage and traffic control and lifting equipment. Permits may also be required for some work environments such as confined spaces, working aloft, near live electrical apparatus and site rehabilitation.

2. Compliance may be required in various jurisdictions relating to currency in First Aid, confined space, lifting and risk safety measures.

Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

UEENEEE101A	Apply Occupational Health and Safety regulations, codes and practices in the workplace
UEENEEE102A	Fabricate, assemble and dismantle utilities industry components
UEENEEE104A	Solve problems in d.c. circuits
UEENEEE105A	Fix and secure electrotechnology equipment
UEENEEE107A	Use drawings, diagrams, schedules, standards, codes and specifications
UEENEEF102A	Install and maintain cabling for multiple access to telecommunication services

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Prerequisite Unit(s) **4)**

For the full prerequisite chain details for this unit please refer to Table 2 in Volume 1, Part 2

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve competency in this unit if they have reading, writing and numeracy skills indicated by the following scales. Description of each scale is given in Volume 2, Part 3 'Literacy and Numeracy'

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare to install	1.1 OHS procedures for a given work area are

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ELEMENT	PERFORMANCE CRITERIA	
and/or modify copper cabling.		identified, obtained and understood.
	1.2	Health and safety risks are identified and established risk control measures and procedures are followed in preparation for the work.
	1.3	Safety hazards that have not previously been identified are noted and established risk control measures are implemented.
	1.4	Installation or modification of wiring is prepared in consultation with others affected by the work and sequenced appropriately.
	1.5	The nature and location of the work is determined from documentation or in discussion with appropriate person(s) to establish the scope of work to be undertaken.
	1.6	Cable routes are planned within the constraints of the building structure, fire walls, cultural/heritage requirements and regulations.
	1.7	Advice is sought from appropriate persons to ensure the work is coordinated effectively with others.
	1.8	Material needed for the installation work is obtained in accordance with established procedures and checked against job requirements.
	1.9	Tools, equipment and testing devices needed to for the installation work are obtained in accordance with established procedures and checked for correct operation and safety.
	1.10	Preparatory work is checked to ensure no damage has occurred and that it complies with requirements.
2 Install copper cables or modify.	2.1	OHS risk control measures and procedures for carrying out the work are followed.
	2.2	Cables are installed or modification to comply with manufacturer specifications, technical standards and job requirements with sufficient

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ELEMENT	PERFORMANCE CRITERIA	
		excess to affect terminations.
	2.3	Established methods for dealing with unexpected situations are discussed with appropriate person(s) and documented.
	2.4	Unexpected situations are dealt with safely and with the approval of an authorised person.
	2.5	Ongoing checks of the quality of installed or modified wiring are undertaken in accordance with established procedures.
	2.6	Cable installation/modification is carried out efficiently without waste of materials or damage to apparatus, circuits or the surrounding environment and using sustainable energy practices.
3 Terminate copper cables.	3.1	OHS risk control measures and procedures for carrying out the work are followed.
	3.2	Cable termination work area is cleaned and safety measure implemented.
	3.3	Cables are prepared for termination in accordance with manufacturer specifications and technical standards.
	3.4	Over voltage protection devices are fitted to cables with metallic components.
	3.5	Cable shields are earthed in accordance with manufacturer specifications and technical standards.
	3.6	Twist ratio of structured metallic cables is maintained in accordance with manufacturer specifications and technical standards.
	3.7	Twisted pair cables are terminated in accordance with manufacturer specifications and technical standards.
	3.8	Cable performance tests are conducted accurately and results documented.
	3.9	Causes of defects indicated by test results are

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ELEMENT	PERFORMANCE CRITERIA	
		identified and rectified.
	3.10	Unexpected situations are dealt with safely and with the approval of an authorised person.
	3.11	Ongoing checks of the quality of installed wiring are undertaken in accordance with established procedures.
	3.12	Cable terminations are carried out efficiently without waste of materials or damage to apparatus, circuits or the surrounding environment and using sustainable energy practices.
4 Document and verify copper cabling installation and performance.	4.1	OHS work completion risk control measures and procedures are followed.
	4.2	Work site is cleaned and made safe in accordance with established procedures.
	4.3	Final checks are made to that the installed cabling conforms to requirements.
	4.4	Documentation certifying system performance is issued to an appropriate person(s).

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of safe working practices and installing and modifying performance data communication structured cabling.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

KS01-EF104A Copper communication cable installation and modification practices

Evidence shall show an understanding of copper communication cable installation and modification practices, applying safe working practices and relevant Standards, Codes and Regulations to an extent indicated by the following aspects:

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REQUIRED SKILLS AND KNOWLEDGE

T1. Telecommunication cable types

- construction
- characteristics and
- applications

T2. Cable identification

- plans and drawing
- labelling
- documentation

T3. Cable installation

- Hazards
- Cable damage prevention
- Cable dispensers

T4. Building construction

- Domestic buildings
- Commercial buildings

T5. Fixing devices

- Bracketed assemblies
- Hard wall fixing devices
- Soft wall fixing devices
- Ties

T6. Cable enclosures

- Types
- Fixing
- Regulations

T7. Distribution boxes and back mounts

- Systems
- Termination Boundaries and devices

T8. Electrical connections

- Hazards
- Regulations

T9. Cable preparation and terminations and hauling mechanisms

- Indoor Methods
- Outdoor Methods

T10. Category 5 and 6 structured cabling

- design principles

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REQUIRED SKILLS AND KNOWLEDGE

T11. Category 5 and 6 structured cabling installation systems

- coaxial cable construction
- uses
- requirements

T12. Category 5 and 6 structured cabling performance requirements

- approved practices
- safety requirements
- connectors
- terminating tools
- continuity tests
- fault diagnosis
- recording results

T13. Selecting cable and cabling hardware

- cable characteristics
- higher performance cable types
- requirements of Australian Standards

T14. Testing Category 5 and 6 cabling

- Testing

T15. Local area network cabling systems

T16. Coaxial cables

- Coaxial cables
- Coaxial cable installation systems
- Twisted pair cable installation systems

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the unit and must be read in conjunction with the performance criteria and the range statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this unit. It must be used in conjunction with all parts of the unit and performed in accordance with the Assessment Guidelines of this Training Package.

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Overview of Assessment **9.1)**

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the industry-preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accordance with industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Sources of evidence need to be ‘rich’ in nature to minimise error in judgment.

Activities associated with normal everyday work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its ‘richness’. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit **9.2)**

Before the critical aspects of evidence are considered all prerequisites shall be met.

Evidence for competence in this unit shall be considered

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holistically. Each element and associated performance criteria shall be demonstrated on at least two occasions in accordance with the 'Assessment Guidelines – UEE11'. Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices, including the use of risk control measures as specified in the performance criteria and range statement
  - Apply sustainable energy principles and practices as specified in the performance criteria and range statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in this unit. It may be required by some jurisdictions that RTOs provide a percentile graded result for the purpose of regulatory or licensing requirements.
  - Demonstrate an appropriate level of skills enabling employment
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated consistent performance across a representative range of contexts from the prescribed items below:
  - Install and modify performance data communication structured cabling as described in 8) and including:

A	Reading and interpreting drawings related to cable layouts, cable schedules and apparatus locations.
B	Routing, placing and securing cables to comply with requirements
C	Maintaining fire integrity
D	Preparing and terminating each type of cable to comply with requirements.
E	Conducting cable performance test accurately
F	Identifying and rectifying anomalies
G	Completing the necessary documentation accurately.

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H	Dealing with unplanned events by drawing on essential knowledge and skills to provide appropriate solutions incorporated in a holistic assessment with the above listed items.

Note:

Successful completion of relevant vendor training may be used to contribute to evidence on which competency is deemed. In these cases the alignment of outcomes of vendor training with performance criteria and critical aspects of evidence shall be clearly identified.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

These should be used in the formal learning/assessment environment.

Note:

Where simulation is considered a suitable strategy for assessment, conditions must be authentic and as far as possible reproduce and replicate the workplace and be consistent with the approved industry simulation policy.

The resources used for assessment should reflect current industry practices in relation to installing and modifying performance data communication structured cabling.

Method of assessment

9.4)

This unit shall be assessed by methods given in Volume 1, Part 3 ‘Assessment Guidelines’.

Note:

Competent performance with inherent safe working practices is

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expected in the Industry to which this competency standard unit applies. This requires assessment in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

For optimisation of training and assessment effort, competency development in this unit may be arranged concurrently with unit:

UEENEEF109A	Install and connect data and voice communication equipment

Range Statement

RANGE STATEMENT

10) This relates to the unit as a whole providing the range of contexts and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

This unit shall be demonstrated in relation to installing and modifying performance structured metallic cables each on at least two occasions.

Generic terms used throughout this Vocational Standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms that apply are given in Volume 2, Part 2.1.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Data and Voice Communications

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UEENEEF105A Install and modify optical fibre performance data communication cabling

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit covers the installation and modification of high performance data communication optical fibre cabling in buildings and premises and intended for connection a telecommunications network. It encompasses working safely and to standards, installing multiple data lines and backbones using optical fibre cabling, terminating at distributors, splices and on socket outlets, testing and compliance checks and completing cabling documentation.

Application of the Unit

Application of the Unit **2)**

This unit is intended for competency development in entry-level employment based programs incorporated in approved contracts of training.

Licensing/Regulatory Information

License to practice **3)**

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License to practice **3)**

The skills and knowledge described in this unit require a registration to practise in the workplace subject to requirements set out ACMA 'Open' Cabling Provider Rule. Practice in workplace and during training is also subject to regulations directly related to occupational health and safety and where applicable contracts of training such as apprenticeships.

Note:
1. Compliance with permits may be required in various jurisdictions and typically relates to the operation of plant, machinery and equipment such as elevating work platforms, powder operated fixing tools, power operated tools, vehicles, road signage and traffic control and lifting equipment. Permits may also be required for some work environments such as confined spaces, working aloft, near live electrical apparatus and site rehabilitation.
2. Compliance may be required in various jurisdictions relating to currency in First Aid, confined space, lifting and risk safety measures.

Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

UEENEEE101A	Apply Occupational Health and Safety regulations, codes and practices in the workplace
UEENEEE102A	Fabricate, assemble and dismantle utilities industry components
UEENEEE104A	Solve problems in d.c. circuits
UEENEEE105A	Fix and secure electrotechnology equipment
UEENEEE1	Use drawings, diagrams, schedules,

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Prerequisite Unit(s) **4)**

07A	standards, codes and specifications
UEENEEF102A	Install and maintain cabling for multiple access to telecommunication services

For the full prerequisite chain details for this unit please refer to Table 2 in Volume 1, Part 2

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve competency in this unit if they have reading, writing and numeracy skills indicated by the following scales. Description of each scale is given in Volume 2, Part 3 'Literacy and Numeracy'

Reading	3	Writing	3	Numeracy	3

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT		PERFORMANCE CRITERIA	
1	Prepare to install or modify optical fibre cabling	1.1	OHS procedures for a given work area are identified, obtained and understood.
		1.2	Health and safety risks are identified and established risk control measures and procedures are followed in preparation for the work.
		1.3	Safety hazards that have not previously been identified are noted and established risk control measures are implemented.
		1.4	Installation or modification of wiring is prepared in consultation with others affected by the work and sequenced appropriately.
		1.5	The nature and location of the work is determined from documentation or in discussion with appropriate person(s) to establish the scope of work to be undertaken.
		1.6	Advice is sought from appropriate persons to ensure the work is coordinated effectively with others.
		1.7	Material needed for the installation work is obtained in accordance with established procedures and checked against job requirements.
		1.8	Tools, equipment and testing devices needed to for the installation work are obtained in accordance with established procedures and checked for correct operation and safety.
		1.9	Preparatory work is checked to ensure no damage has occurred and that it complies with requirements.
2	Install or modify optical fibre cables	2.1	OHS risk control measures and procedures for carrying out the work are followed.
		2.2	Optical fibres are tested for optical continuity.
		2.2	Cables are installed or modification to comply with manufacturer specifications, technical standards and job requirements with sufficient excess to affect terminations.
		2.4	Established methods for dealing with unexpected situations are discussed with appropriate person(s) and

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ELEMENT	PERFORMANCE CRITERIA	
		documented.
	2.5	Unexpected situations are dealt with safely and with the approval of an authorised person.
	2.6	Ongoing checks of the quality of installed wiring are undertaken in accordance with established procedures.
	2.7	Cable installation/modification is carried out efficiently without waste of materials or damage to apparatus, circuits or the surrounding environment and using sustainable energy practices.
3 Terminate optical fibre cables.	3.1	OHS risk control measures and procedures for carrying out the work are followed.
	3.2	Cable termination work area is cleaned and safety measure implemented, particularly for terminating optical fibre cables.
	3.3	Cables are prepared for termination in accordance with manufacturer specifications and technical standards.
	3.4	Optical fibre connectors are fitted in accordance with manufacturer specifications and technical standards.
	3.5	Appropriate methods are used to splice optical fibre cables in strict accordance with OHS safety measures, manufacturer specifications and technical standards.
	3.6	Cable performance tests are conducted accurately and results documented.
	3.7	Causes of defects indicated by test results are identified and rectified.
	3.8	Unexpected situations are dealt with safely and with the approval of an authorised person.
	3.9	Ongoing checks of the quality of installed wiring are undertaken in accordance with established procedures.
	3.10	Cable terminations are carried out efficiently without waste of materials or damage to apparatus, circuits or the surrounding environment and using sustainable energy practices.
4 Document installation or	4.1	OHS work completion risk control measures and

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ELEMENT	PERFORMANCE CRITERIA	
		procedures are followed.
modification, and verify data communication optical fibre cabling performance.	4.2	Work site is cleaned and made safe in accordance with established procedures.
	4.3	Final checks are made to that the installed cabling conforms to requirements.
	4.4	Documentation certifying system performance is issued to an appropriate person(s).

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of safe working practices and installing and modifying performance data communication optical fibre cabling.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies..

KS01-EF105A Optical fibre cable installation and modification practices

Evidence shall show an understanding of optical fibre communication cable installation and modification practices, applying safe working practices and relevant Standards, Codes and Regulations to an extent indicated by the following aspects:

T1. Telecommunications Standards and Regulations

- Telecommunications Wiring Rules AS/ACIF S009 or its replacement.
- Telecommunications Equipment Standards AS/ACIF S008 or its replacement.
- Cabling Provider Rules.

T2. Risk Management Principles with respect to:

- laser and similar products.
- optical fibre products.
- low voltage and extra low voltage circuits.
- working in hazardous areas.

T3. Optical Fibre Safety - Laser

- AS/NZS 2211.1 Safety of laser products
- AS/NZS 2211.2 Safety of optical fibre communications systems (OFCS)

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REQUIRED SKILLS AND KNOWLEDGE

- Nature of intense light outside of the visible light spectrum.
- Safety precautions to be employed when working with intense light sources.
- Laser classifications and their typical uses

T4. 4. Optical Fibre Safety - Hazards

- Chemicals used in the installation and termination process including Isopropyl Alcohol, Acetone, Kerosene, Mineral Turpentine and other solvents.
- Epoxy resins and other adhesives.
- Hot surface precautions.
- Disposal of hazardous materials including sharps (syringes glass shards and the like).
- Working in confined spaces and at height.

T5. Optical Theory

- Electromagnetic Spectrum and the place of visible light, infrared and ultra violet bands.
- Frequency of oscillation and the relationship to wavelength of light.
- Propagation speed and the refractive index.
- Reflection of light and refraction of light.

T6. Optical Fibre Principles of Operation

- Multi Mode Optical Fibres (MMOF)
- Single Mode Optical Fibres (SMOF)
- Advantages and applications
- Refractive index and how it can be employed in optical fibres.
- Transmission path for laser energy within the optical fibre.
- Optical fibre performance and the mechanisms that may result in losses.
- Requirements of optical fibre cables as specified in current Standards

T7. Installation of Cables

- Requirements of the standard AS/ACIF S009 or its replacement.
- AS/NZS 3080 or its replacement.
- Installation requirements of cables by the manufacturer.
- Building Codes of Australia.
- Construction of domestic, commercial and industrial buildings.
- Purpose and procedures for pre-testing optical fibre cable prior to installation
- Bending radii and hauling requirements.
- Cable supporting structures, cable trays and catenaries
- Types of securing devices and anchors.
- Safety precautions

T8. Terminating Fibre Cables

- Precautions required for the use of solvents and cleaning agents.

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REQUIRED SKILLS AND KNOWLEDGE

- Safe handling and disposal of waste materials at the conclusion of termination.
- Safe handling of fibre cables that may carry laser light energy.
- Manual means of striping and cleaning optical fibre cables.
- Optical devices to safely examine optical fibre cables.
- Mechanical means to terminate or splice optical fibre cables
- Termination devices and methods
- Preparation and splicing techniques.
- Devices used to protect terminations and splices against mechanical damage.
- Colour individual fibre cables and tubes to ensure end to end integrity.

T9. Testing optical fibre cables.

- AS/NZS 3080 Telecommunications Installations
- Concept of measurements in decibels.
- Loss measurements methods at different wavelengths of light
- Setting up required equipment for accurate testing and the calibration of that equipment.
- Precautions employed to ensure accurate measurements.
- Operating principles and applications of an Optical Time Domain Reflectometer (OTDR).
- Operating principles and applications of an visible light source and an optical light loss test set
- Extraction and recording of test reports.
- Analyse and interpretation of test reports and corrective action.

T10. Building Construction and the building codes.

- Building Codes of Australia
- Construction of domestic, commercial and industrial buildings

T11. Supporting structures and fixings

- Types of cable supporting structures, cable trays and catenaries
- Types of securing devices for anchoring cable trays and catenaries.

T12. Administration and management (records)

- Completion Compliance Certificate (TCA1)
- Contractual obligations for the provision of test results and reports to customers.
- Requirements to keep and make available copies of test results of individual fibres.
- Requirements to record cable pathways and locations of coiled extra cable length for expansion or re-termination.
- Requirements of labelling Frames, Cabinets and outlets.
- Requirements of record keeping for cross connects and patches.
- How to plan records indicating history of faults or deficiencies attributed to the fibre cable to plan replacement or maintenance.

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Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the unit and must be read in conjunction with the performance criteria and the range statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this unit. It must be used in conjunction with all parts of the unit and performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the industry-preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accordance with industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Sources of evidence need to be ‘rich’ in nature to minimise error in judgment.

Activities associated with normal everyday work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its ‘richness’. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and

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developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all prerequisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated performance criteria shall be demonstrated on at least two occasions in accordance with the 'Assessment Guidelines – UEE11'. Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices, including the use of risk control measures as specified in the performance criteria and range statement
  - Apply sustainable energy principles and practices as specified in the performance criteria and range statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in this unit. It may be required by some jurisdictions that RTOs provide a percentile graded result for the purpose of regulatory or licensing requirements.
  - Demonstrate an appropriate level of skills enabling employment
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated consistent performance across a representative range of contexts from the prescribed items below:
  - Install and modify performance data communication optical fibre cabling as described in 8) and including:

A Reading and interpreting drawings related to cable layouts, cable schedules and apparatus locations.

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B	Routing, placing and securing cables to comply with requirements
C	Maintaining fire integrity
D	Preparing and terminating each type of cable to comply with requirements.
E	Conducting cable performance test accurately
F	Identifying and rectifying anomalies
G	Completing the necessary documentation accurately.
H	Dealing with unplanned events by drawing on essential knowledge and skills to provide appropriate solutions incorporated in a holistic assessment with the above listed items.

Note:

Successful completion of relevant vendor training may be used to contribute to evidence on which competency is deemed. In these cases the alignment of outcomes of vendor training with performance criteria and critical aspects of evidence shall be clearly identified.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

These should be used in the formal learning/assessment environment.

Note:

Where simulation is considered a suitable strategy for assessment, conditions must be authentic and as far as possible reproduce and replicate the workplace and be consistent with the approved

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industry simulation policy.

The resources used for assessment should reflect current industry practices in relation to installing and modifying performance data communication optical fibre cabling

Method of assessment

9.4)

This unit shall be assessed by methods given in Volume 1, Part 3 'Assessment Guidelines'.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this competency standard unit applies. This requires assessment in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

For optimisation of training and assessment effort, competency development in this unit may be arranged concurrently with unit:

UEENEEF109A	Install and connect data and voice communication equipment

Range Statement

RANGE STATEMENT

10) This relates to the unit as a whole providing the range of contexts and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

This unit shall be demonstrated in relation to installing or modifying two types of performance optical fibre cables each on at least two occasions.

Generic terms used throughout this Vocational Standard shall be regarded as part of

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RANGE STATEMENT

the Range Statement in which competency is demonstrated. The definition of these and other terms that apply are given in Volume 2, Part 2.1.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Data and Voice Communications

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UEENEEF107A Set up and configure the wireless capabilities of communications and data storage devices

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit covers entering instructions in wireless devices with simple built-in programming function and verifying that the device operates as intended. It encompasses safe working practices, checking device software installation, following written and oral instruction and procedures and completing necessary documentation.

Note: Examples of wireless devices are personal digital assistants(PDAs), mobile phones, personal computers(PCs) remote controls etc

Application of the Unit

Application of the Unit **2)**

This unit is intended for competency development entry-level employment based programs incorporated in approved contracts of training. It may be used to augment previously acquired competencies.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit may require a registration to practise in the workplace subject to requirements set out ACMA 'Open' Cabling Provider Rule. Practice in workplace and during training is also

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License to practice **3)**

subject to regulations directly related to occupational health and safety and where applicable contracts of training such as apprenticeships.

Note:

1. Compliance with permits may be required in various jurisdictions and typically relates to the operation of plant, machinery and equipment such as elevating work platforms, powder operated fixing tools, power operated tools, vehicles, road signage and traffic control and lifting equipment. Permits may also be required for some work environments such as confined spaces, working aloft, near live electrical apparatus and site rehabilitation.

2. Compliance may be required in various jurisdictions relating to currency in First Aid, confined space, lifting and risk safety measures.

Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

UEENEEE101A	Apply Occupational Health and Safety regulations, codes and practices in the workplace

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve competency in this unit if they have reading, writing and numeracy skills indicated by the following scales. Description of each scale is given in Volume 2, Part 3 ‘Literacy and Numeracy’

Reading 3 Writing 3 Numeracy 3

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Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare to enter operating instructions.	1.1 OHS procedures for a given work area are identified, obtained and understood through established routines and procedures.
	1.2 Established OHS risk control measures and procedures in preparation for the work are followed.
	1.3 Safety hazards that have not previously been identified are reported and advise on risk control measures are sought from the work supervisor.
	1.4 Work supervisor or customers are consulted to determine which functions of the device are to be use and the parameter of each.
	1.5 Tools, equipment and testing devices needed to carry out the work are obtained and checked for correct operation and safety.

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ELEMENT	PERFORMANCE CRITERIA	
	1.6	Device installation is checked for compliance with job specification and regulations where they apply.
2 Enter operating instructions.	2.1	Established OHS risk control measures and procedures for carrying out the work are followed.
	2.2	Circuits/machines/plant are checked as being isolated where necessary in strict accordance OHS requirements and procedures.
	2.3	The required status of each function of the device is entered and their parameters set in accordance with manufactures programming instructions.
	2.4	Entered data are checked as meeting those specified by the work supervisor or customer.
	2.5	Procedures for referring non-routine events to immediate supervisor for directions are followed.
3 Test device operation and report.	3.1	Device operation is tested in strict accordance OHS requirements and procedures.
	3.2	Operating anomalies are identified and corrected in accordance with established routines.
	3.3	OHS work completion risk control measures and procedures are followed.
	3.4	Work site is cleaned and made safe in accordance with established procedures.
	3.5	Work completion is reported and appropriate person(s) notified in accordance with established routines.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this

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REQUIRED SKILLS AND KNOWLEDGE

unit.

Evidence shall show that knowledge has been acquired of safe working practices and set up and configuring the wireless capabilities of communications and data storage devices.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies..

KS01-EF107A Wireless devices

Evidence shall show an understanding of wireless devices, applying safe working practices and relevant Standards, Codes and Regulations to an extent indicated by the following aspects:

T1. Types and applications

T2. Operating principles at sub-system level

T3. Programming functions

T4. Networking set up

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the unit and must be read in conjunction with the performance criteria and the range statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this unit. It must be used in conjunction with all parts of the unit and performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the industry-preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that,

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in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accordance with industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Sources of evidence need to be 'rich' in nature to minimise error in judgment.

Activities associated with normal everyday work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all prerequisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated performance criteria shall be demonstrated on at least two occasions in accordance with the 'Assessment Guidelines – UEE11'. Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices, including the use of risk control measures as specified in the performance criteria and range

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statement

- Apply sustainable energy principles and practices as specified in the performance criteria and range statement
- Demonstrate an understanding of the essential knowledge and associated skills as described in this unit. It may be required by some jurisdictions that RTOs provide a percentile graded result for the purpose of regulatory or licensing requirements.
- Demonstrate an appropriate level of skills enabling employment
- Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures

- Demonstrated consistent performance across a representative range of contexts from the prescribed items below:
  - Set up the wireless capabilities of communications and data storage devices as described in 8) and including:

A	Understanding required operating functions and parameters.
B	Identifying non-compliance conditions of device installation.
C	Entering functions and parameters correctly.
D	Correcting programming anomalies.
E	Testing and verify device operation.
F	Dealing with unplanned events by drawing on essential knowledge and skills to provide appropriate solutions incorporated in a holistic assessment with the above listed items

Note:

Successful completion of relevant vendor training may be used to contribute to evidence on which competency is deemed. In these cases the alignment of outcomes of vendor training with performance criteria and critical aspects of evidence shall be clearly identified.

Context of and specific resources for assessment

9.3)

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This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

These should be used in the formal learning/assessment environment.

Note:

Where simulation is considered a suitable strategy for assessment, conditions must be authentic and as far as possible reproduce and replicate the workplace and be consistent with the approved industry simulation policy.

The resources used for assessment should reflect current industry practices in relation to setting up the wireless capabilities of communications and data storage devices.

Method of assessment

9.4)

This unit shall be assessed by methods given in Volume 1, Part 3 'Assessment Guidelines'.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this competency standard unit applies. This requires assessment in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no concurrent assessment recommendations for this unit.

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Range Statement

RANGE STATEMENT

10) This relates to the unit as a whole providing the range of contexts and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

This unit shall be demonstrated in relation to entering and verifying operating instruction in at least two types of microprocessor equipped devices with built-in icon-based programmable functions such as programmable relays, timers, temperature controllers, detection devices for security and fire.

Generic terms used throughout this Vocational Standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms that apply are given in Volume 2, Part 2.1.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Data and Voice Communications

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UEENEEF108A Select and arrange equipment for wireless communication networks

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit covers selecting and arranging of wireless access devices, routers and switches for local area and wide area networks intended for connection to a telecommunications network. The unit encompasses selecting compliant equipment, developing LAN/WAN arrangements that comply with regulation, based on calculated and deemed-to-comply solutions and completing network documentation.

Application of the Unit

Application of the Unit **2)**

This unit is intended as an additional competency to relevant competencies previously acquired and is therefore not applicable to those entering work.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a license to practice in the workplace. However practice in this unit is subject to regulations directly related to occupational health and safe and contracts of training such as new apprenticeships.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

UEENEEE101A	Apply Occupational Health and Safety regulations, codes and practices in the workplace

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve competency in this unit if they have reading, writing and numeracy skills indicated by the following scales. Description of each scale is given in Volume 2, Part 3 ‘Literacy and Numeracy’

Reading	3	Writing	3	Numeracy	3

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT		PERFORMANCE CRITERIA	
1	Prepare to select equipment.	1.1	The extent and nature of the communications network is determined from job specifications.
		1.2	Safety and other regulatory requirements to which the wireless network area shall comply are identified, obtained and understood.
2	Arrange locations of equipment and cable routes.	2.1	Location of equipment is arranged to comply with job specifications and regulatory requirements.
		2.2	Cable routes are planned to ensure maximum lengths specified by standards and the manufacturer are not exceeded.
		2.3	Cable routes are planned to comply with job specifications and regulatory requirements.
		2.4	Earthing is arranged to comply with job specifications and regulatory requirements.
3	Select cables and equipment.	3.1	Cables types are selected for suitability for the environments in which they are to be installed, performance required, and regulatory requirements.
		3.2	Cable sizes are selected to meet capacity and performance requirements.
		3.3	Earthing components are selected to meet regulatory and earthing requirements.
		3.4	Evidence is obtained that network equipment selected complies with safety requirements.
		3.5	Electronic equipment types are selected for suitability for the environments in which they are to be installed, performance required, and regulatory requirements.
4	Document communications	4.1	Reasons for selections made, including calculations, are documented in accordance with

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ELEMENT	PERFORMANCE CRITERIA
network.	established procedures.
	4.2 Wireless networks equipment for arrangement and specifications for all selected items are documented in accordance with established procedures and forwarded to appropriate person(s).

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of safe working practices and selecting and arranging equipment for wireless networks.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

KS01-EF108A Wireless network equipment, selection and arrangements

Evidence shall show an understanding of wireless network equipment selection and arrangements, applying safe working practices and relevant Standards, Codes and Regulations to an extent indicated by the following aspects:

T1. Operating systems and networks

- Operating system fundamentals
- Networking fundamentals
- Physical components of a network
- Transmission Control Protocol / Internet Protocol (TCP / IP) encompassing:
- Network Services
- Network Operating Systems
- Installation and boot processes

T2. Wireless network components for local area and wide area networks

- Types of devices, routers , switches and cables
- Construction and operating principles
- Selection of compliant components and cables

T3. Wireless network configurations

- LAN/WAN arrangements and component locations
- Cable routing

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REQUIRED SKILLS AND KNOWLEDGE

- Earthing
- Compliance with job specifications and regulation/s
- Calculated and deemed-to-comply solutions and completing network documentation.

T4. Wireless network security

T5. Wireless network documentation

- Purpose and extent of maintaining work activities records in an enterprise
- Types of records for maintaining work activities in an enterprise
- Methods for recording and maintaining work records
- Work records required by regulation requirements
- Established procedures and appropriate person(s).
- Reasons for selections made, including calculations
- Wireless networks equipment for arrangement and specifications for all selected items

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the unit and must be read in conjunction with the performance criteria and the range statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this unit. It must be used in conjunction with all parts of the unit and performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment	**9.1)**
	Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the industry-preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accordance with industry

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and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Sources of evidence need to be 'rich' in nature to minimise error in judgment.

Activities associated with normal everyday work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all prerequisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated performance criteria shall be demonstrated on at least two occasions in accordance with the 'Assessment Guidelines – UEE11'. Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices, including the use of risk control measures as specified in the performance criteria and range statement
  - Apply sustainable energy principles and practices as

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specified in the performance criteria and range statement

- Demonstrate an understanding of the essential knowledge and associated skills as described in this unit. It may be required by some jurisdictions that RTOs provide a percentile graded result for the purpose of regulatory or licensing requirements.
- Demonstrate an appropriate level of skills enabling employment
- Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures

- Demonstrated consistent performance across a representative range of contexts from the prescribed items below:
  - Select and arrange equipment for wireless networks as described in 8) and including:

A	Arranging network to comply with safety and other regulatory and functional requirements
B	Selecting appropriate types and sizes of cables
C	Arranging network equipment
D	Selecting appropriate earthing components
E	Documenting installation arrangement, specification for items selected and reasons for the selections made
F	Dealing with unplanned events by drawing on essential knowledge and skills to provide appropriate solutions incorporated in a holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

These should be used in the formal learning/assessment

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environment.

Note:

Where simulation is considered a suitable strategy for assessment, conditions must be authentic and as far as possible reproduce and replicate the workplace and be consistent with the approved industry simulation policy.

The resources used for assessment should reflect current industry practices in relation to selecting and arranging equipment for wireless networks.

Method of assessment

9.4)

This unit shall be assessed by methods given in Volume 1, Part 3 'Assessment Guidelines'.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this competency standard unit applies. This requires assessment in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

Nil

Range Statement

RANGE STATEMENT

10) This relates to the unit as a whole providing the range of contexts and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

This unit shall be demonstrated in relation to selecting and arranging equipment for

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RANGE STATEMENT

wireless networks comprising a representative range of network wireless components.

Generic terms used throughout this Vocational Standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms that apply are given in Volume 2, Part 2.1.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Data and Voice Communications

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UEENEEF111A Test, report and rectify faults in data and voice installations

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit covers testing for certification finding and repairing faults in telecommunication installations and local area networks. The unit encompasses working safely, reading cabling diagrams, performance testing, applying logical fault finding procedures, testing functionality of the network, conducting repairs and completing the necessary documentation.

Application of the Unit

Application of the Unit **2)**

This unit is intended for competency development in entry-level employment based programs incorporated in approved contracts of training

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit require a registration to practise in the workplace subject to requirements set out ACMA ‘Open’ Cabling Provider Rule. Practice in workplace and during training is also subject to regulations directly related to occupational health and safety and where applicable contracts of training such as apprenticeships.

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License to practice **3)**

Note:

1. Compliance with permits may be required in various jurisdictions and typically relates to the operation of plant, machinery and equipment such as elevating work platforms, powder operated fixing tools, power operated tools, vehicles, road signage and traffic control and lifting equipment. Permits may also be required for some work environments such as confined spaces, working aloft, near live electrical communications equipment and site rehabilitation.

2. Compliance may be required in various jurisdictions relating to currency in First Aid, confined space, lifting and risk safety measures.

Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

UEENEEE101A	Apply Occupational Health and Safety regulations, codes and practices in the workplace
UEENEEE102A	Fabricate, assemble and dismantle utilities industry components
UEENEEE104A	Solve problems in d.c. circuits
UEENEEE105A	Fix and secure electrotechnology equipment
UEENEEE107A	Use drawings, diagrams, schedules, standards, codes and specifications
UEENEEF102A	Install and maintain cabling for multiple access to telecommunication services
UEENEEF10	Install and modify performance data

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Prerequisite Unit(s) **4)**

4A	communication copper cabling
UEENEEF10	Install and modify performance data
5A	communication optical fibre cabling

For the full prerequisite chain details for this unit please refer to Table 2 in Volume 1, Part 2

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve competency in this unit if they have reading, writing and numeracy skills indicated by the following scales. Description of each scale is given in Volume 2, Part 3 'Literacy and Numeracy'

Reading	3	Writing	3	Numeracy	3

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare to test, report and rectify faults.	1.1 OHS procedures for a given work area are identified, obtained and understood.
	1.2 Health and safety risks are identified, and established risk control measures and procedures in preparation for the work are followed.
	1.3 Safety hazards that have not previously been identified are noted, and established risk control measures are implemented.
	1.4 Testing is prepared in consultation with others affected by the work and sequenced appropriately.
	1.5 The nature and location of the work is determined from documentation or in discussion with appropriate person(s) to establish the scope of work to be undertaken.
	1.6 Advice is sought from appropriate persons to ensure the work is coordinated effectively with others.
	1.7 Material needed for the testing, reporting and rectifying work is obtained in accordance with established procedures and checked against job requirements.
	1.8 Tools, equipment and testing devices needed to for the work are obtained in accordance with established procedures and checked for correct operation and safety.
	1.9 Preparatory work is checked to ensure no damage has occurred and that it complies with requirements.
2 Test and rectify faults	2.1 OHS risk control measures and procedures for carrying out the work are followed.
	2.2 Tests are carried out in strict accordance with OHS established safety procedures.
	2.3 Tests are prepared and conducted in accordance with test equipment operating instructions and

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ELEMENT	PERFORMANCE CRITERIA	
		requirements.
	2.4	Cable performance tests are conducted accurately and results documented in accordance with established procedures.
	2.5	Causes of defects or faults indicated by test results are identified and rectified in accordance with established procedures.
	2.6	Established methods for dealing with unexpected situations are discussed with appropriate person(s) and documented.
	2.7	Unexpected situations are dealt with safely and with the approval of an authorised person.
	2.8	Ongoing checks of the quality of installed equipment are undertaken in accordance with established procedures.
	2.9	Testing and rectifying faults is carried out efficiently without waste of materials or damage to equipment, circuits, the surrounding environment or services and using sustainable energy principles.
3 Document and verify installation performance.	3.1	OHS work completion risk control measures and procedures are followed.
	3.2	Work site is cleaned and made safe in accordance with established procedures.
	3.3	Service reports are completed, when necessary in accordance with established procedures.
	3.4	Documentation certifying system performance is issued to an appropriate person(s).

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

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REQUIRED SKILLS AND KNOWLEDGE

Evidence shall show that knowledge has been acquired of safe working practices and testing, reporting and rectifying faults in voice and data installations.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

KS01-EF111A Data and voice cabling testing devices and techniques

Evidence shall show an understanding of data and voice cabling testing devices and techniques, applying safe working practices and relevant Standards, Codes and Regulations to an extent indicated by the following aspects:

T1. Networking fundamentals

- Analogue and digital signals encompassing:
  - How information is carried
  - Signal distortion

Examples include attenuation, reflection, noise, dispersion, jitter, latency and collisions

- Types of networks, network components and hardware
- Local Area Network (LAN) architectures
- Networking protocols and the OSI model
- Network signal propagation
- Transmission Control Protocol / Internet Protocol (TCP/IP)
- Basics of Encoding Networking Signals
- Internet services

T2. Basic electrical testing and measuring devices and techniques encompassing:

- Types and applications of testing/measuring devices including voltage testers, multimeters, clamp meters, continuity testers and insulation resistance testers.
- Features of testing/measuring devices including safety, user calibration and parameter and range settings.
- Connection of test/measuring devices into a circuit
  - safety procedures
  - circuit arrangement of test/measuring devices
- Taking readings
- Storage, maintenance and care of test/measuring devices.
- Australian Standard quality assurance requirements for test equipment calibration certification.

T3. Performance parameters associated with copper cables, coaxial cables and optical cables encompassing:

- Open circuit, short circuit and pair continuity
- Split pair and crossed pair

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REQUIRED SKILLS AND KNOWLEDGE

- Attenuation
- Return loss
- Insulation Resistance (leakage)
- Near end cross talk (NEXT)
- Attenuation to cross talk ratio (ACR)
- Loop resistance
- Noise (Impulse noise and average noise)
- Characteristic impedance

Note: Structured cabling including, twisted pair cabling, shielded twisted pair (STP), unshielded twisted pair (UTP) and higher performance cabling.

T4. Test results for compliance with required regulation, standards, and or codes for structured copper cables, coaxial; and optical fibre cables encompassing:

- Tests required to evaluate a given performance parameter
- Test equipment and leads needed to evaluate a given performance parameter.
- Operation of test equipment for correct evaluation of specific cable performance parameters and to obtain accurate and reliable results.
- Transmission performance requirements.

T5. Testing and validation of a customer premises cabling installation encompassing:

- Requirements of current Standard of site certification for high performance copper cables, coaxial cable and optical fibre cables
- Reporting requirements for the completion of work related to conformity of a cabling installation.
- Documentation required in certifying a cabling installation conforms to relevant standards and specifications.

T1. Optical Time Domain Reflectometer (OTDR) operating principles, applications and calibration procedures encompassing:

T2. Typical causes of non compliant test results.

T3. Recording, reporting and maintaining test results encompassing:

- Purpose and extent of maintaining work activities records in an enterprise
- Types of records for maintaining work activities in an enterprise
- Methods for recording and maintaining work records
- Work records required by regulation requirements

Evidence Guide

EVIDENCE GUIDE

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EVIDENCE GUIDE

9) This provides essential advice for assessment of the unit and must be read in conjunction with the performance criteria and the range statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this unit. It must be used in conjunction with all parts of the unit and performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the industry-preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accordance with industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Sources of evidence need to be ‘rich’ in nature to minimise error in judgment.

Activities associated with normal everyday work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its ‘richness’. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

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Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all prerequisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated performance criteria shall be demonstrated on at least two occasions in accordance with the 'Assessment Guidelines – UEE11'. Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices, including the use of risk control measures as specified in the performance criteria and range statement
  - Apply sustainable energy principles and practices as specified in the performance criteria and range statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in this unit. It may be required by some jurisdictions that RTOs provide a percentile graded result for the purpose of regulatory or licensing requirements.
  - Demonstrate an appropriate level of skills enabling employment
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated consistent performance across a representative range of contexts from the prescribed items below:
  - Test, report and rectify faults in voice and data installations as described in 8) and including:

A Reading and interpreting drawings and schedules of the installation

B Preparing and conducting appropriate test accurately

C Interpreting test results correctly

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D	Identifying defects/faults from test results
E	Rectifying faults effectively
F	Completing the required documentation accurately.
G	Dealing with unplanned events by drawing on essential knowledge and skills to provide appropriate solutions incorporated in a holistic assessment with the above listed items

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

These should be used in the formal learning/assessment environment.

Note:

Where simulation is considered a suitable strategy for assessment, conditions must be authentic and as far as possible reproduce and replicate the workplace and be consistent with the approved industry simulation policy.

The resources used for assessment should reflect current industry practices in relation to testing, reporting and rectifying faults in voice and data installations

Method of assessment

9.4)

This unit shall be assessed by methods given in Volume 1, Part 3 ‘Assessment Guidelines’.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this competency standard unit applies. This requires assessment in a structured environment

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which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

For optimisation of training and assessment effort, competency development in this unit may be arranged concurrently with unit:

UEENEEF104A	Install and modify performance data communication copper cabling
UEENEEF105A	Install and modify optical fibre performance data communication cabling
UEENEEF109A	Install and connect voice and data communications equipment

Range Statement

RANGE STATEMENT

10) This relates to the unit as a whole providing the range of contexts and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

This unit shall be demonstrated in relation to testing, reporting and rectifying faults in voice and data installations comprising two different items of customer premises equipment and a local area network.

Generic terms used throughout this Vocational Standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms that apply are given in Volume 2, Part 2.1.

Unit Sector(s)

Not applicable.

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Competency Field

Competency Field 11)

Data and Voice Communications

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UEENEEG006A Solve problems in single and three phase low voltage machines

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This unit covers ascertaining correct operation of single and three phase machines and solving machine problems as they apply to servicing, fault finding, installation and compliance work functions. It encompasses safe working practices, machine connections circuit arrangements, issues related to machine operation, characteristics and protection and solutions to machine problems derived from calculated and measured parameters.

Application of the Unit

Not Applicable

Licensing/Regulatory Information

1.2) License to practice

During Training: Competency development activities are subject to regulations directly related to licencing, occupational health and safety and where applicable contracts of training such as apprenticeships.

In the workplace: The application of the skills and knowledge described in this unit require a license to practice in the workplace where work is carried out on electrical equipment or installations which are designed to operate at voltages greater than 50 V a.c. or 120 V d.c.

Other conditions may apply under State and Territory legislative and regulatory requirements.

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Pre-Requisites

Prerequisite Unit(s) **2)**

2.1) Competencies

Granting competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

UEENEEE101A Apply Occupational Health and Safety regulations, codes and practices in the workplace

UEENEEE102A Fabricate, dismantle, assemble of electrotechnology components

UEENEEE104A Solve problems in d.c circuits

UEENEEE105A Fix and secure electrotechnology equipment

UEENEEE107A Use drawings, diagrams, schedules, standards, codes and specifications

UEENEEG101A Solve problems in electromagnetic devices and related circuits

UEENEEG102A Solve problems in low voltage a.c. circuit

UEENEEG106A Terminate cables, cords and accessories for low voltage circuits

2.2) Further Information:

For the full prerequisite chain details for this unit please refer to Table 2 in Volume 1, Part 2.

Employability Skills Information

Employability Skills **3)**

This unit contains Employability Skills

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

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Application of the Unit **4**)

4.1) **General Application**

This unit applies to all qualifications, competencies and/or Skill Sets which require an electrical licence.

4.2) **Importation**

RTOs wishing to import this unit into any qualification under the flexibility provisions of NQC Training Package Policy

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a unit of competency

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Prepare to solve single and three phase low voltage machines problems.	1.1	OHS procedures for a given work area are identified, obtained and understood.
	1.2	Established OHS risk control measures and procedures in preparation for the work are followed.
	1.3	Safety hazards, which have not previously been identified, are noted and established risk control measures are implemented.
	1.4	The nature of the machine (s) problem is obtained from documentation or from work supervisor to establish the scope of work to be undertaken.
	1.5	Advice is sought from the work supervisor to ensure the work is coordinated effectively with others.
	1.6	Sources of materials that may be required for the work are established in accordance with established procedures.

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ELEMENT	PERFORMANCE CRITERIA	
	1.7	Tools, equipment and testing devices needed to carry out the work are obtained and checked for correct operation and safety.
2 Solve single and three phase low voltage machine problems.	2.1	OHS risk control measures and procedures for carrying out the work are followed.
	2.2	The need to test or measure live is determined in strict accordance with OHS requirements and when necessary conducted within established safety procedures.
	2.3	Circuits/machines/plant are checked as being isolated where necessary in strict accordance OHS requirements and procedures.
	2.4	Established methods are used to solve machine problems from measure and calculated values as they apply to single and three-phase low voltage machines.
	2.5	Established methods for dealing with unexpected situations are discussed with appropriate person or persons and documented.
	2.6	Unexpected situations are dealt with safely and with the approval of an authorised person.
	2.7	Problems are solved without damage to machines, circuits, the surrounding environment or services and using sustainable energy practices.
3 Complete work and document problem solving activities.	3.1	OHS work completion risk control measures and procedures are followed.
	3.2	Work site is cleaned and made safe in accordance with established procedures.
	3.3	Justification for solutions used to solve machine problems is documented.
	3.4	Work completion is documented and an appropriate person or persons notified in accordance with established procedures.

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of safe working practices and solving problems in single and three phase low voltage machines.

The knowledge and skills shall be contextualised to current industry standards, technologies and practices.

KS01-EG006A Single and three-phase transformers

Evidence shall show an understanding of single and three phase transformers to an extent indicated by the following aspects:

T1 Transformer construction encompassing:

- types of lamination style and core construction used in single-phase, three phase, double wound, auto transformers and instrument transformers.
- identification of different winding styles/types used in transformers.
- methods used to insulate low and high voltage transformers.
- construction of transformer tanks for distribution transformers.
- transformer auxiliary equipment. (Bushings, surge-diverters, tap-changers, hot oil & winding indicators, breather, Buchholz relay and conservator).
- function of transformer auxiliary equipment.
- types of information stated on transformer nameplates.
- application of transformers.
- performing basic insulation resistance, continuity and winding identification tests.

T2 Transformer operation encompassing:

- principles of mutual induction of a transformer.
- factors that determine the induced voltage in a transformer winding.
- determining the value of a transformers secondary voltage and current given one winding’s electrical details and turns ratio.
- identification of voltage and current components of a phasor diagram for a transformer on no-load.
- principles of power transferred from the primary to secondary when a load is connected using a phasor diagram neglecting impedance drops.
- selecting transformers for specific application/s.
- safety features specified in AS/NZS3000 with respect to transformers and isolating transformers.

T3 Transformer losses, efficiency and cooling encompassing:

- power losses which occur in a transformer.
- tests which allow the power losses of a transformer to be determine.
- determination of transformer losses and efficiency using test results.

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REQUIRED SKILLS AND KNOWLEDGE

- relationship between transformer cooling and rating.
- methods used for natural and forced cooling of transformers.
- properties of transformer oil.
- tests conducted on transformer oil.

T4 Transformer voltage regulation and percent impedance encompassing:

- voltage regulation as applicable to a transformer.
- reasons for voltage variation in the output of a transformer.
- determine the voltage regulation of a transformer from voltage and percentage impedance values.
- percentage impedance as applied to transformers.
- determine the percent impedance by using test results.
- determine percent impedance of a transformer by calculation.

T5 Parallel operation of transformers and transformer auxiliary equipment encompassing:

- determine polarity markings for an unidentified single phase double wound transformer.
- need for parallel operation of transformers.
- conditions/restrictions required before two transformers can be connected in parallel.
- connecting transformers in parallel to supply a single load (loading on transformers operating in parallel).
- the consequences/effect of an incorrect connection.

T6 Auto-transformers and instrument transformers encompassing:

- identification of auto-transformers, voltage transformers and current transformers from their winding diagrams.
- determining voltage and current in the windings of an auto-transformer by calculation.
- advantages and disadvantages of an auto-transformer.
- AS/NZS3000 requirements with respect to transformers.
- construction of voltage transformers.
- ratings of voltage transformers.
- construction of current transformers.
- ratings of current transformers.
- precautionary measures taken to connect and disconnect instrument transformers.
- connection diagrams for instrument transformers.
- applications for auto-transformers and instrument transformers.

KS02-EG006A Alternating current rotating machines

Evidence shall show an understanding of alternating current rotating machines to an extent indicated by the following aspects:

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REQUIRED SKILLS AND KNOWLEDGE

T1 Operating Principles of three phase induction motors encompassing:

- determining circuit operating characteristics by using the right hand (grip) rule for conductors and solenoids and Fleming's left and right hand rules.
- characteristics of the magnetic field produced by a single, two and three-phase windings.
- speed of rotation of a rotating magnetic field.
- relationship between the rotor speed, slip and rotor frequency.
- basic principle of operation of an induction motor.
- reversing the direction of rotation of a three phase induction motor

T2 Three phase induction motor construction encompassing:

- basic component parts of a three-phase induction motor.
- types of rotors used in three-phase induction motors.
- connecting three-phase induction motor in both star and delta.
- dismantling three-phase induction motors.
- testing insulation resistance of a three-phase induction motor prior to connection to the supply.
- testing winding resistance (ohmic value and continuity) of a three-phase induction motor prior to connection to the supply

T3 Three phase induction motor characteristics encompassing:

- relationship between torque, speed, and power and interpretation of speed/torque curves of induction motors.
- squirrel cage motors operating characteristics conditions necessary for an induction motor to produce maximum torque.
- operating characteristics of an induction motor from name plate information and by measurement.
- induction motors efficiency and minimum energy performance standards (MEPS).
- full load efficiency and power factor of induction motors.

T4 Single phase motors – split phase encompassing:

- common types of single phase motor.
- principles of operation of a split phase induction motor.
- construction and basic characteristics of a split phase induction motor.
- applications of split phase induction motors.
- connecting, running and reversing a split phase induction motor.

T5 Single phase motors – capacitor and shaded pole types encompassing:

- identification of single phase induction motors including capacitor start, capacitor start/capacitor run, permanent split capacitor (PSC) and shaded pole
- principles of operation of each motor type listed above.
- operating characteristics and typical applications of each motor type listed above.
- connection and running each type of motor listed.

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REQUIRED SKILLS AND KNOWLEDGE

- reversing the direction of rotation of each of the capacitor type motors.

T6 Single phase motors – universal encompassing:

- principles of operation of a series universal motor.
- identification and functions of each of the basic parts of a series universal motor.
- operating characteristics and typical uses for a series universal motor.
- connecting, running and reversing a series universal motor.

T7 Motor protection encompassing:

- reasons why motor protection is required.
- requirements of the AS/NZS3000 Wiring rules with regards to motor protection.
- types of motor overload protection.
- operating principles of microtherm devices, thermal and magnetic motor protection devices.
- electrical features of motor protection HRC fuses.
- effects of under voltage and over voltage on motors and motor circuits.
- effects of repetitive starting and/or reversing on motors.
- special requirements for motor protection, in high humidity or moist environments, high temperature areas and corrosive atmospheres.
- operating principles of phase failure protection.
- selecting suitable protective devices for a given motor and starter combination.

T8 Three phase synchronous machines- operation principles and construction encompassing:

- power transfer diagram of an a.c. synchronous machine.
- need for the generation of a sinusoidal waveform.
- principles of operation of a synchronous alternator.
- principles of operation of a synchronous motor.
- principles of operation of an asynchronous generator (induction generator).
- identification of main parts of a synchronous alternator/motor.
- methods used to provide the excitation of a synchronous alternator/motor.
- block diagram of an alternator voltage regulator.
- advantages gained by the parallel operation of alternators.
- starting methods of synchronous motors.

T9 Alternators and generators encompassing:

- effects on the generated voltage of variations in excitation.
- effects on generated voltage of variations in load.
- identification of characteristic curves of an alternator.
- types of prime movers used with single and three phase portable/standby alternators.
- manual operation of single and three phase portable/standby alternators.
- ratings of single and three phase portable/standby alternators.
- applications of single and three phase portable/standby alternators.

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REQUIRED SKILLS AND KNOWLEDGE

- construction details of single and three phase portable/standby alternators.
- common faults found in portable/standby alternators.

Evidence Guide

EVIDENCE GUIDE

9) The evidence guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

The Evidence Guide forms an integral part of this unit. It must be used in conjunction with all parts of this unit and performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

9.1)

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accordance with industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Sources of evidence need to be 'rich' in nature to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to

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EVIDENCE GUIDE

consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all prerequisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated performance criteria shall be demonstrated on at least two occasions in accordance with the 'Assessment Guidelines - UEE07'. Evidence shall also comprise:

- A representative body of performance criteria demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the performance criteria and range statement
  - Apply sustainable energy principles and practices as specified in the performance criteria and range statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in this unit. It may be required by some jurisdictions that RTOs provide a percentile graded result for the purpose of regulatory or licensing requirements.
  - Demonstrate an appropriate level of skills enabling employment
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated consistent performance across a representative range of contexts from the prescribed items below:
  - Solve problems in single and three phase low voltage machines as described as described in 8) and including:

    A Determining the operating parameters of existing machines.

    B Altering an existing machine to comply with specified operating parameters.

    C Developing machines/circuits to comply with a specified function and operating parameters.

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EVIDENCE GUIDE

D Determining the cause of low efficiency in an existing machine.

E Determining conditions causing an existing circuit to be unsafe.

F Dealing with unplanned events

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

These should be part of the formal learning/assessment environment.

Note:

Where simulation is considered a suitable strategy for assessment, conditions must be authentic and as far as possible reproduce and replicate the workplace and be consistent with the approved industry simulation policy.

The resources used for assessment should reflect current industry practices in relation to solving problems in single and three phase low voltage machines.

Method of assessment

9.4)

This unit shall be assessed by methods given in Volume 1, Part 3 'Assessment Guidelines'.

Note: Competent performance with inherent safe working practices is expected in the industry to which this unit applies. This requires assessment in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no concurrent assessment recommendations for this unit.

The critical aspects of occupational health and safety covered in unit UEENEEE001B and other discipline specific occupational health and safety units shall be incorporated in relation to this unit.

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EVIDENCE GUIDE

Range Statement

RANGE STATEMENT

8) This relates to the unit as a whole providing the range of contexts and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

This unit shall be demonstrated in relation to any four of the following problems in single and three-phase low voltage machine and circuits.

- Determining the operating parameters of existing machines
- Altering an existing machine circuit to comply with specified operating parameters
- Developing machine circuits to comply with a specified function and operating parameters

Note:
Operating parameters include voltage, current, torque, efficiency, power, energy and power factor

- Determining the cause of low efficiency in an existing machine.
- Determining problems in existing machines to malfunction

Note:
Problems include bearing noise/faults, vibration, undervoltage, unbalanced windings

- Determining conditions causing an existing machine/circuit to be unsafe.

Note:
Examples of unsafe circuits includes electric shock hazard from indirect contract with conductive parts, insufficiently low impedance of a fault current path and inadequate fault protection

Generic terms used throughout this Vocational Standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms that apply are given in Volume 2, Part 2.1.

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Unit Sector(s)

Not Applicable

Competency Field

2.2) Literacy and numeracy skills

Participants are best equipped to achieve competency in this unit if they have reading, writing and numeracy skills indicated by the following scales. Description of each scale is given in Volume 2, Part 3 'Literacy and Numeracy'

Reading	5	Writing	5	Numeracy	5

2.2) Literacy and numeracy skills

Competency Field **5)**

Electrical

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UEENEEG033A Solve problems in single and three phase low voltage electrical apparatus and circuits

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) **Descriptor**

This unit covers ascertaining correct operation of single and three phase low voltage electrical apparatus and circuits and solving circuit problems as they apply to servicing, fault finding, installation and compliance work functions. It encompasses safe working practices, apparatus circuit arrangements, issues related to operation, characteristics and protection and solutions to apparatus/circuit problems derived from calculated and measured parameters.

Application of the Unit

Not Applicable

Licensing/Regulatory Information

1.2) **License to practice**

During Training: Competency development activities are subject to regulations directly related to licencing, occupational health and safety and where applicable contracts of training such as apprenticeships.

In the workplace: The application of the skills and knowledge described in this unit require a license to practice in the workplace where work is carried out on electrical equipment or installations which are designed to operate at voltages greater than 50 V a.c. or 120 V d.c.

Other conditions may apply under State and Territory legislative and regulatory requirements.

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Pre-Requisites

Prerequisite Unit(s) **2)**

2.1) Competencies

Granting competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

UEENEEE101A Apply Occupational Health and Safety regulations, codes and practices in the workplace

UEENEEE102A Fabricate, dismantle, assemble of electrotechnology components

UEENEEE104A Solve problems in d.c circuits

UEENEEE105A Fix and secure electrotechnology equipment

UEENEEE107A Use drawings, diagrams, schedules, standards, codes and specifications

UEENEEG101A Solve problems in electromagnetic devices and related circuits

UEENEEG102A Solve problems in low voltage a.c. circuit

UEENEEG106A Terminate cables, cords and accessories for low voltage circuits

2.2) Further Information:

For the full prerequisite chain details for this unit please refer to Table 2 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

This unit contains Employability Skills

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

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Application of the Unit **4**)

4.**1**) **General Application**

This unit applies to all qualifications, competencies and/or Skill Sets which require an electrical licence.

4.**2**) **Importation**

RTOs wishing to import this unit into any qualification under the flexibility provisions of NQC Training Package Policy

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a unit of competency

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare to solve single and three phase low voltage electrical apparatus/ circuit problems.	1.1 OHS procedures for a given work area are identified, obtained and understood.
	1.2 Established OHS risk control measures and procedures in preparation for the work are followed.
	1.3 Safety hazards, which have not previously been identified, are noted and established risk control measures are implemented.
	1.4 The nature of the apparatus/circuit(s) problem is obtained from documentation or from work supervisor to establish the scope of work to be undertaken.
	1.5 Advice is sought from the work supervisor to ensure the work is coordinated effectively with others.
	1.6 Sources of materials that may be required for the work are established in accordance with established

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ELEMENT	PERFORMANCE CRITERIA	
		procedures.
	1.7	Tools, equipment and testing devices needed to carry out the work are obtained and checked for correct operation and safety.
2 Solve single and three phase low voltage electrical apparatus/circuit problems.	2.1	OHS risk control measures and procedures for carrying out the work are followed.
	2.2	The need to test or measure live is determined in strict accordance with OHS requirements and when necessary conducted within established safety procedures.
	2.3	Apparatus/circuits/plant is checked as being isolated where necessary in strict accordance OHS requirements and procedures.
	2.4	Established methods are used to solve apparatus/circuit problems from measure and calculated values as they apply to single and three-phase low voltage apparatus/circuit.
	2.5	Established methods for dealing with unexpected situations are discussed with appropriate person or persons and documented.
	2.6	Unexpected situations are dealt with safely and with the approval of an authorised person.
	2.7	Problems are solved without damage to apparatus, circuits, the surrounding environment or services and using sustainable energy practices.
3 Complete work and document problem solving activities.	3.1	OHS work completion risk control measures and procedures are followed.
	3.2	Work site is cleaned and made safe in accordance with established procedures.
	3.3	Justification for solutions used to solve apparatus/circuit problems is documented.
	3.4	Work completion is documented and an appropriate person or persons notified in accordance with established procedures.

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of safe working practices and solving problems in single and three phase low voltage electrical apparatus and circuits.

The knowledge and skills shall be contextualised to current industry standards, technologies and practices.

KS01-EG033A Electrical apparatus and circuits

Evidence shall show an understanding of electrical apparatus and circuits to an extent indicated by the following aspects:

T1 Lighting circuits – looping at the light/switch encompassing:

- the “loop at the light” method of wiring lighting circuits.
- the “loop at the switch” method of wiring lighting circuits
- wiring diagrams for the lighting circuit of an installation that incorporates one-way, two-way and two-way and intermediate switching of light points using the loop at the light/switch methods of TPS wiring.
- TPS cabling requirement for the loop at the light/switch circuit.
- installation methods of accessories and wiring for a lighting circuit incorporating one-way, two-way and two-way and intermediate switching of lighting points using the loop at the light/switch method of TPS wiring.
- correct operation of the install circuits including testing for correct compliance with Australian Standards.

T2 Circuits for socket outlets encompassing:

- the purpose of socket outlets.
- requirements concerning the polarity of switched socket outlets.
- correct cable size to supply 10 A, 15 A and 20 A socket outlets (single and three phase), for given installation conditions.
- number of socket outlets connected to a 16 A and 20 A circuit breaker.
- installation methods of a single phase socket outlet circuits.
- correct operation of the installed circuits including testing (dead testing only) for correct compliance with Australian Standards.

T3 Final sub-circuits and segregation encompassing:

- purpose of mixed circuits.
- circuit loading for a mixed circuit.
- purpose of segregation of circuits and the AS/NZS3000 requirements.
- Installation methods a single phase mixed circuits.

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REQUIRED SKILLS AND KNOWLEDGE

- correct operation of the installed circuits including testing for correct compliance with Australian Standards.

T4 Electrical heating control devices encompassing:

- methods of manual heat control.
- methods of automatic heat control.
- types and application for common thermostats.
- operation of common thermostats.
- sensitivity and differential of thermostats.
- testing of a thermostat (including differential and correct operation)
- applications of simmerstats (infinite controls).
- operation of a simmerstat.
- electronic heat control (phase control and zero voltage switching).

T5 Fixed electrical heating appliances encompassing:

- Terms: heat energy, temperature, specific heat capacity, thermal conductivity and thermal stability.
- determining the heat energy in joules and kWh in a simple heating process.
- methods of heat transfer.
- Determining the heat energy input and output of a heating process.
- connections to a two phase stove.
- operation of reverse cycle air conditioning.

T6 Electrical water heater operation encompassing:

- types of water heaters (instantaneous and storage) and their methods of control.
- intrinsic safety (pressure relief and thermal cut-out).
- testing of over temperature cut-out point of a thermostat.
- switchboard requirements to supply a controlled load water heater.
- internal circuit of a twin element water heater, and supply connections.
- tariffs employed by local supply authorities.
- solar heating system and its integration into an installation.

T7 Alternative supplies encompassing:

- reasons for the installation of alternative supplies.
- types of alternative supply systems.
- characteristics and operation of UPSs.
- Australian Standards and local requirements for safety services supply systems.

T8 Installation of batteries encompassing:

- common types of primary cells and secondary batteries and typical applications.
- terminal voltage of common primary cells and secondary cells.
- correct storage, handling and disposal techniques for cells and batteries.
- charge/discharge cycle for a secondary cell.

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REQUIRED SKILLS AND KNOWLEDGE

- effect of internal resistance on a secondary cell.
- state of charge of a secondary cell.
- installation of batteries as per AS/NZS3011
- commissioning procedures for various secondary batteries.
- safe working procedures when working with secondary cells and batteries.

T9 Fire protection – residential fire and smoke alarms encompassing:

- types of fire and smoke alarms.
- regulations and standards requirements regarding residential fire and smoke alarms.
- locations for residential fire and smoke alarms.
- wiring methods for residential fire and smoke alarms.
- operation of typical residential fire and smoke alarms

T10 Emergency and evacuation lighting and lighting control encompassing:

- factors and requirements of emergency and evacuation lighting concerning illumination levels, luminaire positioning and operating period.
- characteristics of maintained, non maintained and sustained emergency lighting systems.
- arrangement of batteries in point and central bank emergency lighting supply systems.
- lighting control methods

T11 Lighting concepts and incandescent lighting encompassing:

- basic concepts of lighting.
- terminology, principles and standards relevant to lighting (energy efficiency as per BCA new lamp types and permitted replacements and their efficacy)..
- basic types of luminaries.
- operation of an incandescent lamp.
- types of incandescent lamps.
- expected lamp life, colour rendering and efficacy for typical incandescent lamps.
- lighting layout in terms of visual comfort and relevant Australian standards

T12 Fluorescent low intensity discharge lighting encompassing:

- types of low intensity discharge lamps.
- expected lamp life, colour rendering and efficacy for typical types of low intensity discharge lamps.
- operation of low intensity discharge luminaires including their control equipment.
- Australian Standard and local requirements for low intensity discharge lighting.
- methods for satisfying Australian Standards and local supply authority requirements regarding low intensity discharge lighting.

T13 High intensity discharge lighting encompassing:

- types of high intensity discharge lamps.
- expected lamp life, colour rendering and efficacy for typical types of high intensity

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REQUIRED SKILLS AND KNOWLEDGE

discharge lamps.

- operation of high intensity discharge luminaires including their control equipment.
- Australian Standard and local requirements for high intensity discharge lighting.
- methods for satisfying Australian Standards and local supply authority requirements regarding high intensity discharge lighting.
- LED lighting and its applications.
- Neon, Argon and Xenon lighting and their applications.
- comparison of incandescent, low intensity discharge, high intensity discharge, LED and other types of lighting

Evidence Guide

EVIDENCE GUIDE

9) The evidence guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

The Evidence Guide forms an integral part of this unit. It must be used in conjunction with all parts of this unit and performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

9.1)

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accordance with industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical

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EVIDENCE GUIDE

equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Sources of evidence need to be 'rich' in nature to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all prerequisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated performance criteria shall be demonstrated on at least two occasions in accordance with the 'Assessment Guidelines - UEE07'. Evidence shall also comprise:

- A representative body of performance criteria demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the performance criteria and range statement
  - Apply sustainable energy principles and practices as specified in the performance criteria and range statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in this unit. It may be required by some jurisdictions that RTOs provide a percentile graded result for the purpose of regulatory or licensing requirements.
  - Demonstrate an appropriate level of skills enabling employment
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated consistent performance across a representative range of contexts from the prescribed items below:

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EVIDENCE GUIDE

- Solve problems in single and three phase low voltage electrical apparatus and circuits as described as described in 8) and including:

A Determining the operating parameters of existing apparatus/circuits.

B Altering an existing apparatus/circuit to comply with specified operating parameters.

C Developing apparatus/circuits to comply with a specified function and operating parameters.

D Determining the cause of low efficiency in an existing apparatus/circuit.

E Determining conditions causing an existing apparatus/circuit to be unsafe.

F Dealing with unplanned events

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

These should be part of the formal learning/assessment environment.

Note:

Where simulation is considered a suitable strategy for assessment, conditions must be authentic and as far as possible reproduce and replicate the workplace and be consistent with the approved industry simulation policy.

The resources used for assessment should reflect current industry practices in relation to solving problems in electromagnetic circuits.

Method of assessment

9.4)

This unit shall be assessed by methods given in Volume 1, Part 3 'Assessment Guidelines'.

Note: Competent performance with inherent safe working

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EVIDENCE GUIDE

	practices is expected in the industry to which this unit applies. This requires assessment in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.
Concurrent assessment and relationship with other units	**9.5**) There are no concurrent assessment recommendations for this unit.

Range Statement

RANGE STATEMENT

8) This relates to the unit as a whole providing the range of contexts and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

This unit shall be demonstrated in relation to any four types of problems for both single and three-phase apparatus and circuits and three types of circuit/equipment as listed below.

Type of problems	• Determining the operating parameters of existing apparatus/circuit • Altering an existing apparatus/circuit to comply with specified operating parameters • Developing apparatus/circuits to comply with a specified function and operating parameters Note: Operating parameters include voltage, current, efficiency, power, energy and power factor • Determining the cause of low efficiency in an existing apparatus/circuit. • Determining conditions causing an existing apparatus/circuit to be unsafe. Note: Examples of unsafe circuits includes electric shock hazard from indirect contract with conductive parts, insufficiently low impedance of a fault current path and inadequate fault protection
Types of	• Lighting circuits

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RANGE STATEMENT

circuits/equipment	• Power circuits • Rotating machines • Electrical heating • Lighting

Generic terms used throughout this Vocational Standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms that apply are given in Volume 2, Part 2.1.

Unit Sector(s)

Not Applicable

Competency Field

2.2) Literacy and numeracy skills

Participants are best equipped to achieve competency in this unit if they have reading, writing and numeracy skills indicated by the following scales. Description of each scale is given in Volume 2, Part 3 'Literacy and Numeracy'

Reading	4	Writing	4	Numeracy	4

2.2) Literacy and numeracy skills

Competency Field **5)**

Electrical

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UEENEEG063A Arrange circuits, control and protection for general electrical installations

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) **Descriptor**

This unit covers the arrangement and termination of circuits, control and protection devices and systems for electrical installations operating at voltages up to 1,000 V a.c. or 1,500 V d.c. It encompass knowledge and application of schemes for protection of persons and property, correct functioning, ensuring compatibility with the supply, arranging installation into circuits and selecting and arranging switchgear/controlgear and protective devices to meet compliance requirements and documenting arrangement decisions.

Application of the Unit

Not Applicable

Licensing/Regulatory Information

1.2) **License to practice**

The application of the skills and knowledge described in this unit require a license to practice in the workplace where work is carried out on electrical equipment or installations which are designed to operate at voltages greater than 50 V a.c. or 120 V d.c.

Practice in workplace and during training is also subject to regulations directly related to occupational health and safety and where applicable contracts of training such as apprenticeships.

Note:
1. Compliance with permits may be required in various jurisdictions and typically relates to the operation of plant, machinery and equipment such as elevating work

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1.2) License to practice

platforms, powder operated fixing tools, power operated tools, vehicles, road signage and traffic control and lifting equipment. Permits may also be required for some work environments such as confined spaces, working aloft, near live electrical apparatus and site rehabilitation.
2. Compliance may be required in various jurisdictions relating to currency in First Aid, confined space, lifting and risk safety measures.

Pre-Requisites

Prerequisite Unit(s) **2)**

2.1) Competencies

Granting competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

UEENEEE101A Apply Occupational Health and Safety regulations, codes and practices in the workplace

UEENEEE102A Fabricate, dismantle, assemble of electrotechnology components

UEENEEE104A Solve problems in d.c circuits

UEENEEE105A Fix and secure electrotechnolgy equipment

UEENEEE107A Use drawings, diagrams, schedules, standards, codes and specifications

UEENEEG101A Solve problems in electromagnetic devices and related circuits

UEENEEG102A Solve problems in low voltage a.c. circuit

UEENEEG106A Terminate cables, cords and accessories for low voltage circuits

2.2) Further Information:

For the full prerequisite chain details for this unit please refer to Table 2 in Volume 1, Part 2

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Employability Skills Information

Employability Skills **3)**

This unit contains Employability Skills

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Application of the Unit **4)**

4.1) General Application

This unit applies to competency development entry-level employment based programs incorporated in approved contracts of training.

4.2) Importation

RTOs wishing to import this unit into any qualification under the flexibility provisions of NQC Training Package Policy

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a unit of competency

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare to arrange electrical installations circuits, control and protection	1.1 The extent and nature of the electrical installation is determined from job specifications.
	1.2 Safety and other regulatory requirements to which the electrical installation shall comply are identified, obtained and understood.
	1.3 Load requirements for individual current-using

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ELEMENT	PERFORMANCE CRITERIA	
		equipment is determined from job specifications or from consultation with appropriate persons.
2 Arrange electrical installations circuits, control and protection	2.1	Circuits, control and protective devices are arranged to ensure safe and functional operation of the installation and to comply with technical standards and job specifications and requirements.
	2.3	Earthing is arranged and terminated to comply with the MEN system requirements.
	2.4	Protective devices are selected to meet the required switching and tripping currents, co-ordination and discrimination for overload and short-circuit protection.
	2.5	Residual current devices are selected to meet the required circuit, switching and tripping currents required.
	2.6	Switchgear/control gear is selected to meet current, voltage and IP ratings and functional requirements.
	2.7	Switchboards are arranged to accommodate control and protective devices, links, safety services, and other distributor equipment in accordance with requirements.
3 Document electrical installation circuits, control and protection arrangements	3.1	Evidence is obtained from manufacturers/suppliers that electrical equipment selected complies with safety requirements.
	3.2	Reasons for selections made, including calculations, are documented in accordance with established procedures.
	3.3	Electrical installation arrangement and specifications for all selected items are documented in accordance with established procedures and forwarded to appropriate person(s).

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of arranging electrical installations circuits, control and protection.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

KS01-EG063A Electrical installations — arrangement, control and protection

Evidence shall show an understanding of circuit arrangements, control and protection of electrical installations that comply with the Wiring Rules and Service Rules to an extent indicated by the following aspects:

T1 Safety principles to which electrical systems in building and premises shall comply.

- Safety principles are given in Part1 (Section 1) of the Wiring Rules AS/NZS 3000 with deemed-to-comply requirements given in Sections 2 to 8.
- Compliant methods for providing protection - include those for providing protection against direct and indirect contact; thermal effects; unwanted voltages; overcurrent; fault currents; overload; overvoltage; injury from mechanical movement.
- Requirements for installation design and selection of equipment - includes compliant protection arrangements; correct functioning; compatibility with supply; estimation of maximum demands; voltage drop considerations; arrangement of circuits and the like

T2 Circuit and control arrangements encompassing:

- reason for dividing electrical installations into circuits
- factors that shall be considered in determining the number and type of circuits required for an installation.
- daily and seasonal demand for lighting power, heating and other loads in a given installation.
- number and types of circuits required for a particular installation.
- diagrams/schedules of circuits for given installations.
- application and arrangements of SELV and PELV circuits
- application and arrangement of an isolated supply

T3 Hazards and risks in an electrical installation encompassing:

- effects on the human body of various levels of a.c. and d.c. current and duration of current flow for various current paths.
- risk of ignition of flammable materials due the thermal effects of current or electric arcs in normal service of an electrical installation.
- risk of injury from mechanical movement of electrically actuated equipment.

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REQUIRED SKILLS AND KNOWLEDGE

- Protection against direct contact (basic protection)
- acceptable methods
- use of extra-low voltage

T4 Protection against indirect contact encompassing:

- indirect contact with live parts of an electrical installation may occur.
- methods and devices that comply with the Wiring Rules for providing protection against indirect contact.
- components of the 'automatic disconnection of supply' method of protection against indirect contact.
- the terms ‘touch voltage’ and ‘touch current’.
- the current path when a short circuit fault to exposed conductive parts of an appliance occurs.
- protection against indirect contact is by the use of Class II equipment and by electrical separation.
- additional protection by use of Residual Current Devices (RCDs)
- protection against indirect contact by use of extra-low voltage and electrical separation.
- Protection requirements for damp situations.

T5 Earthing encompassing:

- the terms: earthed, earthed situation, earth electrode, equipotential bonding, multiple earthed neutral (MEN) system, protective earth-neutral (PEN) conductor, main earthing conductor, protective earthing (PE) conductor, functional earthing, MEN link.
- selection of minimum size-earthing conductor for a range of active conductor sizes and materials.
- parts of an earthing system and the purpose of each.
- typical arrangement for a MEN earthing system.
- arrangements of protective earthing conductors that comply with the Wiring Rules.
- requirements for equipotential bonding in a range of installation situations.
- Installation of a MEN earthing system for a single phase installation

T6 Protection against overload and short circuit current encompassing:

- overload current or fault currents in an electrical installation.
- equivalent circuit of an earth fault-loop
- level of fault current possible at a given point in an installation from the fault-loop impedance and data from the electricity distributor.
- methods and devices that comply with the Wiring Rules AS/NZS 3000 for providing protection against the damaging effects of overload and fault current
- requirements for co-ordination between protective devices and conductors
- requirements for co-ordination of protection devices for discrimination and back-up protection.

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REQUIRED SKILLS AND KNOWLEDGE

T7 Devices for automatic disconnection of supply encompassing:

- operating principles of thermal/magnet circuit breakers.
- operating principles of common types of fuses.
- operating principles of residual current devices (RCD).
- time/current curves tripping characteristics of various types of circuit breakers that comply with the requirements of the Wiring Rules.
- time/current curves fusing characteristics of various types of fuses that comply with the requirements of the Wiring Rules.
- time/current curves tripping characteristics of various types of RCDs that comply with the requirements of the Wiring Rules.
- factors in a fault loop that will affect the impedance of the circuit.
- maximum impedance of an earth fault-loop to ensure operating of a protection device.
- selecting a fuse for fault current limiting protection.
- drawing switchboard wiring arrangements of 2-pole RCDs, 4-pole RCDs, combination RCD/MCBs.

T8 Protection against over voltage and under voltage encompassing:

- causes of over voltage and how this may affect the electrical system.
- methods for protection against over voltage.
- causes of under voltage and how this may affect the electrical system.
- methods for protection against under voltage.

T9 Control of an electrical installation and circuits encompassing:

- switch types, current and voltage ratings and IP rating and where these apply.
- switching requirements for isolation, emergency, mechanical maintenance and functional control.
- control arrangement for complete installations with and without safety services and an alternative supply.

T10 Switchboards / distribution boards encompassing:

- Purpose, types and applications.
- Physical and circuit arrangements for whole current and CT metering.
- Physical and circuit arrangements of main switches, circuit protection devices, fault-current limiters and metering equipment and other distributor equipment.
- compliance requirements (includes location and access, arc fault protection, identification, construction suitability, equipment marking, wiring, fire protection and arc-fault protection).

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Evidence Guide

EVIDENCE GUIDE

9) The evidence guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

The Evidence Guide forms an integral part of this unit. It must be used in conjunction with all parts of this unit and performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

9.**1**)

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accordance with industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Sources of evidence need to be 'rich' in nature to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required

9.**2**)

Before the critical aspects of evidence are considered all

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EVIDENCE GUIDE

to demonstrate competency in this unit

prerequisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated performance criteria shall be demonstrated on at least two occasions in accordance with the 'Assessment Guidelines - UEE07'. Evidence shall also comprise:

- A representative body of performance criteria demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the performance criteria and range statement
  - Apply sustainable energy principles and practices as specified in the performance criteria and range statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in this unit. It may be required by some jurisdictions that RTOs provide a percentile graded result for the purpose of regulatory or licensing requirements.
  - Demonstrate an appropriate level of skills enabling employment
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated consistent performance across a representative range of contexts from the prescribed items below:
  - arranging electrical installations circuits, control and protection as described as described in 8) and including:

    A Determining the extent and nature of the installation for job specifications

    B Obtaining and understand the safety and other regulatory requirements to which the electrical installation shall comply

    C Determining individual load requirements.

    D Arranging and terminate circuits, control and protective devices to comply with all requirements

    E Selecting circuit protective devices residual current

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EVIDENCE GUIDE

device that comply with all requirements.

F Selecting switchgear and control gear that meet current, voltage and IP ratings and functional requirements.

G Obtaining evidence of compliance for the equipment selected

H Documenting installation arrangement, specification for items selected and reasons for the selections made.

I Dealing with unplanned events

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

These should be part of the formal learning/assessment environment.

Note:

Where simulation is considered a suitable strategy for assessment, conditions must be authentic and as far as possible reproduce and replicate the workplace and be consistent with the approved industry simulation policy.

The resources used for assessment should reflect current industry practices in relation to arranging circuits, control and protection for general electrical installations.

Method of assessment

9.4)

This unit shall be assessed by methods given in Volume 1, Part 3 'Assessment Guidelines'.

Note: Competent performance with inherent safe working practices is expected in the industry to which this unit applies. This requires assessment in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent

9.5)

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EVIDENCE GUIDE

assessment and relationship with other units	For optimisation of training and assessment effort, competency development in this unit may be arranged concurrently with unit:
	UEENEEG107A Select wiring systems and cables for low voltage general electrical installations

Range Statement

RANGE STATEMENT

8) This relates to the unit as a whole providing the range of contexts and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

This unit shall be demonstrated in relation to arranging of circuits, control and protection for at least two general electrical installations comprising a main switchboard, supplying more than one circuit each for, lighting, socket outlets, and fixed appliances. One of the installations shall include a distribution board separate from the main switchboard and at least one circuit supplying a three-phase load and a fire pump.

Generic terms used throughout this Vocational Standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms that apply are given in Volume 2, Part 2.1.

Unit Sector(s)

Not Applicable

Competency Field

2.2) Literacy and numeracy skills

Participants are best equipped to achieve competency in this unit if they have reading, writing and numeracy skills indicated by the following scales. Description of each scale is given in Volume 2, Part 3 'Literacy and Numeracy'

Reading	4	Writing	4	Numeracy	4

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2.2) Literacy and numeracy skills

Competency Field **5)**

Electrical

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UEENEEG101A Solve problems in electromagnetic devices and related circuits

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) **Descriptor**

This unit covers determining correct operation of electromagnetic devices and related circuits and providing solutions as they apply to electrical installations and equipment. It encompasses working safely, power circuit problems solving processes, including the use of voltage, current and resistance measuring devices, providing solutions derived from measurements and calculations to predictable problems in electromagnetic devices and related circuits.

Application of the Unit

Not Applicable

Licensing/Regulatory Information

1.2) **License to practice**

During Training: Competency development activities are subject to regulations directly related to licencing, occupational health and safety and where applicable contracts of training such as apprenticeships.

In the workplace: The application of the skills and knowledge described in this unit require a license to practice in the workplace where work is carried out on electrical equipment or installations which are designed to operate at voltages greater than 50 V a.c. or 120 V d.c.

Other conditions may apply under State and Territory legislative and regulatory requirements.

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Pre-Requisites

Prerequisite Unit(s) **2)**

2.1) Competencies

Granting competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

UEENEEE104A Solve problems in d.c circuits

2.2) Further Information:

For the full prerequisite chain details for this unit please refer to Table 2 in Volume 1, Part 2.

Employability Skills Information

Employability Skills **3)**

This unit contains Employability Skills

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Application of the Unit **4)**

4.1) General Application

This unit applies to all qualifications, competencies and/or Skill Sets which require an electrical licence.

4.2) Importation

RTOs wishing to import this unit into any qualification under the flexibility provisions of NQC Training Package Policy

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Elements and Performance Criteria Pre-Content

6) Elements describe
the essential outcomes
of a unit of competency

Elements and Performance Criteria

ELEMENT		PERFORMANCE CRITERIA	
1	Prepare to work on electromagnetic devices and circuits.	1.1	OHS procedures for a given work area are identified, obtained and understood.
		1.2	OHS risk control work preparation measures and procedures are followed.
		1.3	The nature of the device(s)/circuit(s) problem is obtained from documentation or from work supervisor to establish the scope of work to be undertaken.
		1.4	Advice is sought from the work supervisor to ensure the work is coordinated effectively with others.
		1.5	Sources of materials that may be required for the work are established in accordance with established procedures.
		1.6	Tools, equipment and testing devices needed to carry out the work are obtained and checked for correct operation and safety.
2	Solve electromagnetic devices/circuit problems.	2.1	OHS risk control work measures and procedures are followed.
		2.2	The need to test or measure live is determined in strict accordance with OHS requirements and when necessary conducted within established safety procedures.
		2.3	Circuits are checked as being isolated where necessary in strict accordance OHS requirements and procedures.
		2.4	Established methods are used to solving circuit problems from measure and calculated values as they apply to electromagnetic devices/circuits.

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ELEMENT	PERFORMANCE CRITERIA	
	2.5	Unexpected situations are dealt with safely and with the approval of an authorised person.
	2.6	Problems are solved without damage to apparatus, circuits, the surrounding environment or services and using sustainable energy practices.
3 Complete work and document problem solving activities.	3.1	OHS work completion risk control measures and procedures are followed.
	3.2	Work site is cleaned and made safe in accordance with established procedures.
	3.3	Justification for solutions used to solve circuit problems is documented.
	3.4	Work completion is documented and an appropriate person or persons notified in accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of safe working practices and solving problems in electromagnetic devices and related circuits.

The knowledge and skills shall be contextualised to current industry standards, technologies and practices.

KS01-EG101A Electromagnetic devices and circuits

Evidence shall show an understanding of electromagnetic devices and circuits to an extent indicated by the following aspects:

T1 Magnetism encompassing:

- magnetic field pattern of bar and horse-shoe magnets.
- magnets attraction and repulsion when brought in contact with each other.
- common magnetic and non-magnetic materials and groupings (diamagnetic, paramagnetic and ferromagnetic materials).
- principle of magnetic screening (shielding) and its applications.
- practical applications of magnets

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REQUIRED SKILLS AND KNOWLEDGE

- construction, operation and applications of reed switches.

T2 Electromagnetism encompassing:

- conventions representing direction of current flow in a conductor.
- magnetic field pattern around a single conductor and two adjacent conductors carrying current.
- Using the “right hand rule” to determine the direction of magnetic field around a current carrying conductor.
- direction of force between adjacent current carrying conductors.
- effect of current, length and distance apart on the force between conductors (including forces on bus bars during fault conditions).
- magnetic field around an electromagnet.
- Using the “right hand rule” to determine the direction of magnetic field around a current carrying coil.
- magnetomotive force (m.m.f.) and its relationship to the number of turns in a coil and the current flowing in the coil.
- practical applications of electromagnets.

T3 Magnetic circuits encompassing:

- magnetic characteristic curve for various materials and identify the various regions.
- Identify the various conditions of a magnetic material from its Hysteresis loop.
- factors which determine losses in magnetic material.
- methods used to reduce electrical losses in a magnetic circuit.
- magnetic flux (definition, unit and symbol).
- reluctance as the opposition to the establishment of magnetic flux.
- permeability (definition, symbol and unit).
- difference for magnetic and non-magnetic materials in regards to reluctance and permeability.
- calculation of m.m.f., flux or reluctance given any two values.
- flux density (definition, symbol, unit and calculation).
- magnetising force (definition, symbol, unit and calculation).
- common magnetic circuit types.
- effect of an air gap in a magnetic circuit.
- terms “magnetic leakage” and “magnetic fringing”.

T4 Electromagnetic induction encompassing:

- principle of electromagnetic induction (Faraday’s law of electromagnetic induction).
- applying “Fleming’s right hand rule” to a current a carrying conductor under the influence of a magnetic field.
- calculation of induced e.m.f. in a conductor given the conductor length, flux density and velocity of the conductor.
- calculation of induced e.m.f. in a coil given the number of turns in a coil and the rate of change of flux.

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REQUIRED SKILLS AND KNOWLEDGE

- calculation of force on a conductor given the flux density of the magnetic field, length of the conductor and the current being carried by the conductor.
- Lenz's law
- applications of electromagnetic induction

T5 Inductance encompassing:

- construction of an inductor, including a bifilar winding inductor.
- Australian Standard circuit diagram symbol for the four types of inductor.
- effect of physical parameters on the inductance of an inductor.
- common types of inductor cores.
- applications of the different types of inductors.
- definition of terms self induction, inductance and mutual inductance.
- calculation of value of self induced e.m.f. in a coil.
- mutual induction occurs between two coils.
- graphical relationship between load voltage, current and self induced e.m.f. in a single d.c. circuit having inductance.
- practical applications for the effects of self and mutual induction.
- undesirable effects of self and mutual induction.
- definition of term "time constant" and draw the characteristic curve as applied to a series circuit containing an inductor and a resistor. (LR circuit)Calculation of value of the time constant for an LR circuit given the values of the components.
- time constants required for the current in an LR circuit to reach its final value.
- determining of instantaneous values of voltage and current in an LR circuit using a universal time constant chart.

T6 Measurement Instruments encompassing:

- moving coil, moving iron, dynamometer meter movements and clamp testers.
- practical applications for moving coil, moving iron and dynamometer meter movements.
- Calculation of resistance of shunts and multipliers to extend the range of ammeters and voltmeters.
- factors to be considered in selecting meters for a particular application.
- safety category of meters and their associated applications.
- steps and procedures for the safe use, care and storage of electrical instruments.

T7 Magnetic devices encompassing:

- construction, operation and applications of relays.
- construction, operation and applications of contactors.
- magnetic methods used to extinguish the arc between opening contacts.
- construction, operation and applications of Hall Effect devices.
- operation and applications of magnetostriction equipment.
- construction, operation and application of magnetic sensing devices.

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REQUIRED SKILLS AND KNOWLEDGE

T8 Machine principles encompassing:

- basic operating principle of a generator.
- applying Fleming's right hand rule for generators.
- basic operating principle of a motor.
- applying Fleming's left hand rule for motors.
- calculation of force and torque developed by a motor.

T9 Rotating machine construction, testing and maintenance encompassing:

- components of a d.c. machine.
- difference between a generator and a motor in terms of energy conversion.
- nameplate of a machine.
- using electrical equipment to make electrical measurements and comparison of readings with nameplate ratings.
- Identification of faults in a machine from electrical measurements.
- care and maintenance processes for rotating machines
- safety risks associated with using rotating machinery.

T10 Generators encompassing:

- basic operation of a d.c generator.
- calculation of generated and terminal voltage of a d.c. shunt generator
- prime movers, energy sources and energy flow used to generate electricity.
- types of d.c. generators and their applications.
- methods of excitation used for d.c generators.
- equivalent circuit for a d.c. generator.
- importance of residual magnetism for a self excited generator.
- open circuit characteristics of d.c. generators.
- load characteristics of a d.c generator.
- reversing the polarity of a d.c. generator
- Connect and test a d.c generator on no-load and load
- Identify safety risks associated with using generators.

T11 Motors encompassing:

- operation of a motor and its energy flow.
- effect of back e.m.f. in d.c. motors
- torque as the product of the force on the conductors and the radius of the armature/rotor.
- types of d.c. motors and their applications.
- circuit diagrams for the types of d.c. motors.
- equivalent circuit for the types of d.c. motors.
- calculation of power output of a motor.
- characteristics of the different types of d.c. motors.
- connection and testing a d.c. shunt motor on no-load and load

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REQUIRED SKILLS AND KNOWLEDGE

- reversing the direction of rotation of a d.c. motor.
- safety risks associated with using motors (include risks of series d.c. motors).

T12 Machine efficiency encompassing:

- losses that occur in a d.c machine.
- methods used to determine the losses in a d.c. machine.
- calculation of losses and efficiency of a d.c machine.
- efficiency characteristic of a d.c. machine and the conditions for maximum efficiency.
- application of Minimum Energy Performance standards (MEPS).
- methods used to maintain high efficiency.

Evidence Guide

EVIDENCE GUIDE

9) The evidence guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

The Evidence Guide forms an integral part of this unit. It must be used in conjunction with all parts of this unit and performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

9.1)

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accordance with industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

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The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Sources of evidence need to be 'rich' in nature to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all prerequisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated performance criteria shall be demonstrated on at least two occasions in accordance with the 'Assessment Guidelines - UEE07'. Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the performance criteria and range statement
  - Apply sustainable energy principles and practices as specified in the performance criteria and range statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in this unit. It may be required by some jurisdictions that RTOs provide a percentile graded result for the purpose of regulatory or licensing requirements.
  - Demonstrate an appropriate level of skills enabling employment
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated consistent performance across a representative range of contexts from the prescribed items below:

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EVIDENCE GUIDE

- Solve problems in electromagnetic circuits as described as described in 8) and including:

A Using methodological techniques to solve problems in circuits with an electromagnetic device from measure and calculated values

B Determining the operating parameters of an existing circuit with an electromagnetic device.

C Alternating an existing circuit with an electromagnetic device to comply with specified operating parameters.

D Developing circuits with electromagnetic devices to comply with a specified function and operating parameters.

E Dealing with unplanned events

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

These should be part of the formal learning/assessment environment.

Note:

Where simulation is considered a suitable strategy for assessment, conditions must be authentic and as far as possible reproduce and replicate the workplace and be consistent with the approved industry simulation policy.

The resources used for assessment should reflect current industry practices in relation to solving problems in electromagnetic devices and related circuits.

Method of assessment

9.4)

This unit shall be assessed by methods given in Volume 1, Part 3 'Assessment Guidelines'.

Note:
Competent performance with inherent safe working practices is expected in the industry to which this unit applies. This requires

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EVIDENCE GUIDE

	assessment in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.
Concurrent assessment and relationship with other units	**9**.**5**) For optimisation of training and assessment effort, competency development in this unit may be arranged concurrently with unit:

Range Statement

RANGE STATEMENT

8) This relates to the unit as a whole providing the range of contexts and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

This unit shall be demonstrated in relation to solving problems in electromagnetic devices and related circuits by:

- Determining the operating parameters of an existing circuits with electromagnetic devices
- Altering an existing circuit with an electromagnetic device to comply with specified operating parameters
- Developing circuit with an electromagnetic device to comply with a specified function and operating parameters

AND

In relation to the following on more than one occasions:

Solving problems

- Connecting circuits,
- Using methodological problem solving techniques,
- Solving electromagnetic device problems,
- Demonstrate an understanding of the behaviour of current and voltage in circuits with electromagnetic devices
- Calculating circuit parameters accurately,

Circuit and device testing

- Choose correct instruments and ranges for testing,
- Connect meters to measure parameters in circuits with

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RANGE STATEMENT

electromagnetic devices,

and

At least four of the following electromagnetic devices

- Reed switches
- Solenoids
- Relays
- Contactors
- Inductive limit switches
- Bells
- Lifting magnets
- Core balance devices
- Magnetic overloads
- Motors
- Generators
- Magnetic brakes
- Magnetic circuit breakers

Generic terms used throughout this Vocational Standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms that apply are given in Volume 2, Part 2.1.

Unit Sector(s)

Not Applicable

Competency Field

2.2) Literacy and numeracy skills

Participants are best equipped to achieve competency in this unit if they have reading, writing and numeracy skills indicated by the following scales. Description of each scale is given in Volume 2, Part 3 'Literacy and Numeracy'

Reading	4	Writing	4	Numeracy	4

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2.2) Literacy and numeracy skills

Competency Field **5)**

Electrical

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UEENEEG102A Solve problems in low voltage a.c. circuits

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This unit covers ascertaining correct operation of single and three phase a.c. circuits and solving circuit problems as they apply to servicing, fault finding, installation and compliance work functions. It encompasses safe working practices, multiphase circuit arrangements, issues related to protection, power factor and MEN systems and solutions to circuit problems derived from calculated and measured parameters.

Application of the Unit

Not Applicable

Licensing/Regulatory Information

1.2) License to practice

During Training: Competency development activities are subject to regulations directly related to licencing, occupational health and safety and where applicable contracts of training such as apprenticeships.

In the workplace: The application of the skills and knowledge described in this unit require a license to practice in the workplace where work is carried out on electrical equipment or installations which are designed to operate at voltages greater than 50 V a.c. or 120 V d.c.

Other conditions may apply under State and Territory legislative and regulatory requirements.

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Pre-Requisites

Prerequisite Unit(s) **2)**

2.1) Competencies

Granting competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

UEENEEE101A Apply Occupational Health and Safety regulations, codes and practices in the workplace

UEENEEE104A Solve problems in d.c circuits

UEENEEG101A Solve problems in electromagnetic devices and related circuits

2.2) Further Information:

For the full prerequisite chain details for this unit please refer to Table 2 in Volume 1, Part 2.

Employability Skills Information

Employability Skills **3)**

This unit contains Employability Skills

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Application of the Unit **4)**

4.1) General Application

This unit applies to all qualifications, competencies and/or Skill Sets which require an electrical licence.

4.2) Importation

RTOs wishing to import this unit into any qualification under the flexibility provisions of NQC Training Package Policy

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Elements and Performance Criteria Pre-Content

6) Elements describe
the essential outcomes
of a unit of competency

Elements and Performance Criteria

ELEMENT		PERFORMANCE CRITERIA	
1	Prepare to solve low voltage a.c. circuit problems.	1.1	OHS procedures for a given work area are identified, obtained and understood.
		1.2	Established OHS risk control measures and procedures in preparation for the work are followed.
		1.3	Safety hazards, which have not previously been identified, are noted and established risk control measures are implemented.
		1.4	The nature of the circuit(s) problem is obtained from documentation or from work supervisor to establish the scope of work to be undertaken.
		1.5	Advice is sought from the work supervisor to ensure the work is coordinated effectively with others.
		1.6	Sources of materials that may be required for the work are established in accordance with established procedures.
		1.7	Tools, equipment and testing devices needed to carry out the work are obtained and checked for correct operation and safety.
2	Solve low voltage a.c. circuit problems.	2.1	OHS risk control measures and procedures for carrying out the work are followed.
\		2.2	The need to test or measure live is determined in strict accordance with OHS requirements and when necessary conducted within established safety procedures.
		2.3	Circuits/machines/plant are checked as being isolated where necessary in strict accordance OHS requirements and procedures.

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ELEMENT	PERFORMANCE CRITERIA	
	2.4	Established methods are used to solve circuit problems from measure and calculated values as they apply to single and three-phase low voltage circuit.
	2.5	Unexpected situations are dealt with safely and with the approval of an authorised person.
	2.6	Problems are solved without damage to apparatus, circuits, the surrounding environment or services and using sustainable energy practices.
3 Complete work and document problem solving activities.	3.1	OHS work completion risk control measures and procedures are followed.
	3.2	Work site is cleaned and made safe in accordance with established procedures.
	3.3	Justification for solutions used to solve circuit problems is documented.
	3.4	Work completion is documented and an appropriate person or persons notified in accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of safe working practices and Solving single and three phase low voltage circuit problems.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

KS01-EG102A Alternating current power circuits

Evidence shall show an understanding of alternating currents power circuits to an extent indicated by the following aspects:

T1 Alternating Current Quantities encompassing:

- sine, cosine and tangent ratios of a right angle triangle
- Pythagoras Theorem to a right angle triangle.
- use of the CRO to measure d.c. and a.c. voltage levels

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REQUIRED SKILLS AND KNOWLEDGE

- sinusoidal voltage generated by a single turn coil rotated in a uniform magnetic fields
- terms 'period', 'maximum value', 'peak-to-peak value', 'instantaneous value', 'average value', 'root-mean-square (r.m.s.) value', in relation to a sinusoidal waveform.
- calculation of the instantaneous value of induced voltage of a generated sinusoidal waveform.
- measurement of instantaneous, peak, peak-to-peak values and the period of a sinusoidal waveform.
- calculation of root-mean-square (r.m.s.) value and frequency of a sinusoidal waveform from values of peak voltage and period.

T2 Phasors Diagrams encompassing:

- purpose of phasor diagrams
- 'in-phase', 'out-of-phase', 'phase angle'' lead' and 'lag'.
- phase angle between two or more alternating quantities from a given sinusoidal waveform diagram.
- convention for representing voltage, current and the reference quantity in a phasor diagram.
- drawing phasor diagrams to show the relationship between two or more a.c. values of voltage and/or current.
- determination of phase relationship between two or more sinusoidal waveforms from a given diagram and measurements.

T3 Single Element a.c. circuits encompassing:

- setting up and connect a single-source resistive a.c. circuit and take voltage and current measurements to determine the resistance
- determining the voltage, current resistances from measure of given values of any tow of these qualities.
- relationship between voltage drops and current in resistive a.c. circuit
- applications of resistive a.c. circuits
- defining ‘inductive reactance’.
- calculation of inductive reactance for a given inductor and the relationship between inductive reactance and frequency.
- applying Ohm’s Law to determine voltage, current of inductive reactance in a purely inductive a.c. circuit given any two to these quantities.
- applications of inductive a.c circuits.
- calculation of capacitive reactance
- applying Ohm’s Law to determine voltage, current or capacitive reactance in a purely capacitive a.c circuit given any two of the quantities.
- applications of capacitive a.c circuits

T4 RC and RL Series a.c. circuits encompassing:

- impedance and impedance triangle.
- determining the impedance, current and voltages for a series RC circuit given the resistance, capacitance and supply voltage.

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REQUIRED SKILLS AND KNOWLEDGE

- drawing and labelling the impedance triangle for a series RC circuit
- drawing phasor diagrams for a series RC circuit
- AS/NZS 3000 requirements for the installation of capacitors.
- examples of capacitive components in power circuits and systems and the effect on the phase relationship between voltage and current.
- determining the impedance, current and voltages for a series RL circuit given the resistance, inductance and supply voltage.
- drawing and labelling the impedance triangle for a series RL circuit
- drawing the equivalent circuit of a practical inductor
- Draw phasor diagrams for a series RL circuit.
- examples of inductive components in power circuits and systems and describe their effect on the phase relationship between voltage and current

T5 RLC Series a.c. circuits encompassing:

- measuring component voltages in a series RLC circuit and using a phasor diagram to determine the supply voltage and phase angle between circuit voltage and circuit current.
- determining the impedance, current and voltages for a series RLC circuit given resistance, inductance, capacitance and supply voltage.
- drawing and labelling the impedance triangle for a series RLC circuit.
- calculation of total impedance for a series RLC circuit.
- calculation of voltage drop for cables using the values for reactance and a.c. resistance from AS/NZS 3008.
- comparison of current limiting characteristics of inductors and resistors.
- practical examples of RLC series circuits

T6 Parallel a.c. Circuits encompassing:

- determining the branch currents of a parallel circuit that contain RL, RC or LC in two branches.
- using a phasor diagram to determine the total circuit current and phase angle in parallel RL, RC or LC circuits.
- determining the total circuit impedance of parallel RL, RC or LC circuits.
- measuring the branch currents in a parallel RLC circuit and use a phasor diagram to determine the total current and phase angle between circuit voltage and circuit current.
- determining the branch impedances, branch currents and phase angles voltages for a parallel RLC circuit given resistance, inductance, capacitance and supply voltage.
- calculation of impedance for a parallel RLC circuit.
- practical examples of parallel circuits.

T7 Power in an a.c. circuit encompassing:

- difference between true power, apparent power and reactive power and the units in which these quantities are measured.
- drawing the power triangle to show the relationships between true power, apparent

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REQUIRED SKILLS AND KNOWLEDGE

power and reactive power
- defining the term "power factor" and phase angle.
- methods used to measure single phase power, energy and demand.

T8 Power Factor Improvement encompassing:

- effects of low power factor.
- requirements for power factor improvement.
- methods used to improve low power factor of an installation.
- local supply authority and AS/NZS 3000 wiring rules requirements regarding the power factor of an installation and power factor improvement equipment.
- methods used to measure single phase power factor.
- using manufacturers catalogues to select power factor equipment for a particular installation

T9 Harmonics and Resonance Effect in a.c. Systems encompassing:

- term "harmonic" in relation to the sinusoidal waveform of an a.c. power system.
- sources in a.c. systems that produce harmonics.
- problems that may arise in a.c. circuits as a result of harmonics and how these are overcome.
- methods and test equipment used to test for harmonics
- methods used to reduce harmonics in a.c. power system
- conditions in a series a.c. circuit that produce resonance.
- dangers of series resonance circuits
- conditions in a parallel a.c. circuit that produce resonance.
- dangers of parallel resonance circuits
- AS/NZS3000 and the local supply authority requirements concerning harmonics and resonance effect in a.c. power systems.

T10 Three Phase Systems encompassing:

- features of a multiphase system.
- comparison of voltages generated by single and multiphase alternators.
- reasons for the adoption of three phases for power systems.
- how three phases is generated in a single alternator.
- Calculation of r.m.s. value of voltage generated in each phase given the maximum value.
- relationship between the phase voltages generated in a three phase alternator and the conventions for identifying each.
- term "phase sequence" (also, referred to as "phase rotation").
- determining the phase sequence of a three phase supply

T11 Three phase star-connections encompassing:

- connecting a three phase star-connection load.
- phase relationship between line and phase voltages and line and phase currents of a

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REQUIRED SKILLS AND KNOWLEDGE

star-connected system.
- determining the r.m.s. value of line and phase voltage given any one of these quantities.
- determining the r.m.s. value of line and phase current given any one of these quantities.
- terms "balanced load" and "unbalanced load".
- effect of a reversed phase winding of a star connected alternator.
- example of balanced and unbalanced loads in typical power systems.

T12 Three phase four wire systems encompassing:

- purpose of the neutral conductor in a three phase four wire systems.
- determining the effects of an high impedance in the neutral conductor of a three phase four wire system supplying an unbalanced load where MEN earthing is employed.
- determining the value and phase relationship of neutral current in an unbalanced three phase four wire systems given line currents and power factors.
- AS/NZS 3000 requirements regarding neutral conductors.
- AS/NZS 3008.1.1 method for determining voltage drop in unbalanced three phase circuits

T13 Three phase delta-connections and Interconnected systems encompassing:

- connecting three phase delta loads.
- phase relationship between line and phase voltages and line and phase currents of a delta-connected system.
- determining the r.m.s. value of line and phase voltage given any one of these quantities.
- determining the r.m.s. value of line and phase current given any one of these quantities.
- limitations and uses of open delta connections
- effect of a reversed phase winding of a delta connected transformer
- example of loads in typical power systems.
- drawing the typical combinations of three phase interconnected systems using star-connections and a delta-connection.
- relationship between line and phase voltages and line and phase currents in the typical interconnected systems using star-connections and delta-connections.

T14 Energy and power requirements of a.c. systems encompassing:

- purposes for measuring power, energy, power factor and maximum demand of a.c. power systems and loads.
- difference between true power, apparent power and reactive power and the units in which these quantities are measured in a three phase system.
- drawing the power triangle to show the relationships between true power, apparent power and reactive power in a three phase system.
- methods used to measure three phase power , energy, power factor and demand.
- determining how the power factor of a three phase installation can be improved.
- using manufacturers catalogues to select measurement equipment for a particular installation

T15 Fault Loop Impedance encompassing:

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REQUIRED SKILLS AND KNOWLEDGE

- term fault loop impedance of a a.c. power system
- determining fault loop impedance using resistance and reactance values from AS/NZS 3008.1.1
- measuring fault loop impedance of typical circuits
- procedures for testing fault loop impedance

Evidence Guide

EVIDENCE GUIDE

9) The evidence guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

The Evidence Guide forms an integral part of this unit. It must be used in conjunction with all parts of this unit and performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

9.1)

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accordance with industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Sources of evidence need to be 'rich' in nature to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will

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EVIDENCE GUIDE

contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all prerequisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated performance criteria shall be demonstrated on at least two occasions in accordance with the 'Assessment Guidelines - UEE07'. Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the performance criteria and range statement
  - Apply sustainable energy principles and practices as specified in the performance criteria and range statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in this unit. It may be required by some jurisdictions that RTOs provide a percentile graded result for the purpose of regulatory or licensing requirements.
  - Demonstrate an appropriate level of skills enabling employment
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated consistent performance across a representative range of contexts from the prescribed items below:
  - Solve problems in single and three phase circuits as described as described in 8) and including:

    A Using methodological techniques to solve problems in circuits in a.c. circuits from measure and calculated values

    B Determining the operating parameters of existing circuits

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C Altering an existing circuit to comply with specified operating parameters.

D Developing circuits to comply with a specified function and operating parameters.

E Determining the cause of low power factor in an existing circuit.

F Determining conditions causing an existing circuit to be unsafe.

G Dealing with unplanned events

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

These should be part of the formal learning/assessment environment.

Note:

Where simulation is considered a suitable strategy for assessment, conditions must be authentic and as far as possible reproduce and replicate the workplace and be consistent with the approved industry simulation policy.

The resources used for assessment should reflect current industry practices in relation to solving single and three phase low voltage circuit problems.

Method of assessment

9.4)

This unit shall be assessed by methods given in Volume 1, Part 3 'Assessment Guidelines'.

Note: Competent performance with inherent safe working practices is expected in the industry to which this unit applies. This requires assessment in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent

9.5)

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assessment and relationship with other units	For optimisation of training and assessment effort, competency development in this unit may be arranged concurrently with unit:

Range Statement

RANGE STATEMENT

8) This relates to the unit as a whole providing the range of contexts and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

This unit shall be demonstrated in relation to solving problems in a.c. circuit by:

- Determining the operating parameters of existing circuits
- Altering an existing circuit to comply with specified operating parameters
- Developing circuits to comply with a specified function and operating parameters of voltage, current, impedance, power and power factor
- Determining the cause of low power factor in an existing circuit.
- Determining conditions causing an existing circuit to be unsafe includes electric shock hazard from indirect contract with conductive parts, insufficiently low impedance of a fault current path and inadequate fault protection.

In relation to the following on more than one occasions:

Single phase circuits

- Connecting single-phase circuits
- Choosing correct instruments
- Taking measurements correctly and accurately.

Three-phase circuits

- Connecting three-phase circuits
- Choosing correct instruments
- Taking measurements correctly and accurately.

AND

At least four of the following applications

- Series a.c. circuits
- Parallel a.c. circuits

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RANGE STATEMENT

- Series / parallel a.c. circuits
- Single phase motors / controls
- Three phase motors / controls
- Synchronous machines
- Transformers / Auxiliary components
- Star connected circuits
- Delta connected circuits
- Star-Delta interconnected circuits
- Open Delta circuits

Generic terms used throughout this Vocational Standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms that apply are given in Volume 2, Part 2.1.

Unit Sector(s)

Not Applicable

Competency Field

2.2) Literacy and numeracy skills

Participants are best equipped to achieve competency in this unit if they have reading, writing and numeracy skills indicated by the following scales. Description of each scale is given in Volume 2, Part 3 'Literacy and Numeracy'

Reading	4	Writing	4	Numeracy	4

Custom Content Section

Competency Field **5)**

Electrical

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UEENEEG106A Terminate cables, cords and accessories for low voltage circuits

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) **Descriptor**

This unit covers the termination of cables and cords and their conductors at accessories and current-using devices designed to operate at voltages up to 1,000 V a.c. or 1,500 V d.c. It encompasses working safely and to standards, understanding wiring system and cable types and applications, selecting appropriate termination accessories, preparing and terminating cables and cords, terminating cables/cord conductors and ensuring completed termination complies with requirements.

Application of the Unit

Not Applicable

Licensing/Regulatory Information

1.2) **License to practice**

During Training: Competency development activities are subject to regulations directly related to licensing, occupational health and safety and where applicable contracts of training such as apprenticeships.

In the workplace: The application of the skills and knowledge described in this unit require a license to practice in the workplace where work is carried out on electrical equipment or installations which are designed to operate at voltages greater than 50 V a.c. or 120 V d.c.

Other conditions may apply under State and Territory legislative and regulatory requirements.

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Pre-Requisites

Prerequisite Unit(s) **2)**

2.1) Competencies

Granting competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

UEENEEE101A Apply Occupational Health and Safety regulations, codes and practices in the workplace

UEENEEE102A Fabricate, dismantle, assemble and electrotechnology components

UEENEEE105A Fix and secure electrotechnology equipment

UEENEEE107B Use drawings, diagrams, schedules, standards, codes and specifications

2.2) Further Information:

For the full prerequisite chain details for this unit please refer to Table 2 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

This unit contains Employability Skills

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Application of the Unit **4)**

4.1) General Application

This unit applies to competency development entry-level employment based programs incorporated in approved contracts of training.

4.2) Importation

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RTOs wishing to import this unit into any qualification under the flexibility provisions of NQC Training Package Policy

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a unit of competency

Elements and Performance Criteria

ELEMENT		PERFORMANCE CRITERIA	
1	Prepare to terminate cables, cords and conductors	1.1	OHS procedures for a given work area are identified, obtained and understood.
		1.2	Health and safety risks are identified and established risk control measures and procedures in preparation for the work are followed.
		1.3	Safety hazards that have not previously been identified are noted and established risk control measures are implemented.
		1.4	The junction box/ terminal enclosures and terminal types are inspected to select the type and size of cable and conductor termination devices needed.
		1.5	Tools, materials and testing devices needed to for terminating cables and cords are obtained in accordance with established procedures and checked for correct operation and safety.
2	Terminate cables, cords and conductors	2.1	OHS risk control measures and procedures for carrying out the work are followed.
		2.2	Circuits/machines/plant are checked as being isolated where necessary in strict accordance OHS requirements and procedures.

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ELEMENT	PERFORMANCE CRITERIA	
	2.3	Cable/cord ends are cut and sheath/insulation stripped with sufficient length to prevent stain on terminations and without undue waste.
	2.4	Cable glands/retaining devices are fitted and secured to ensure cable/cord cannot be pulled out of entry into junction box/ terminal enclosure
.	2.5	Conductors are prepared to suit the type of terminal at which there are to be connected.
	2.6	Conductors are terminated to ensure continuity across the terminal.
	2.7	Established methods for dealing with unexpected situations are discussed with appropriate person or persons and documented.
	2.8	Unexpected situations are dealt with safely and with the approval of an authorised person.
3 Test terminated cables and cords	3.1	OHS work completion risk control measures and procedures are followed.
	3.2	Terminated cables are tested to ensure continuity and insulation resistance comply with requirements.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of safe working practices and terminating cables, cords and accessories for low voltage circuits.

The knowledge and skills shall be contextualised to current industry standards, technologies and practices.

KS01-EG106A Wiring systems types, application and terminations

Evidence shall show an understanding of wiring systems types, application and terminations to an extent indicated by the following aspects:

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REQUIRED SKILLS AND KNOWLEDGE

T1 Cable types and terminations encompassing:

- cable variates (single cables, flexible cables, flexible cords, shielded cables, armoured cables, ribbon cables, other similar and like cables)
- structural components of cables and their purpose (conductor material, stranding, insulation type, voltage rating, screening, sheathing, armour and serving)
- Australian and International colour standards for cords and cables
- construction of common cables
- identification of cords and cables by conductor size, type and rating
- application of various cords and cables types
- identification of hardware used in terminating cords and cables
- preparation and termination of cords and cables
- termination of cords and cables using crimp lugs, tunnel connectors, soldering and solderless lugs
- requirements to protect and support cables adequately (protection against mechanical damage, protection from adverse temperatures and corrosion and protection from magnetic field that may affect the performance of the cable).

T2 Cords, cables and plugs encompassing:

- selection of flexible cords for given applications
- preparation of cord ends for connection
- fitting standard three pin plug tops to a flexible cords
- fitting standard three pin extension sockets to a flexible cords
- connecting variety of plugs to different flexible cord types
- requirements of AS/NZS 3000 for flexible cords, cables and plugs
- using test equipment to test and locate various faults in flexible cords and cables.

T3 Flat TPS wiring systems encompassing:

- Australian Standards requirements for the termination and protection of flat TPS cable
- Installation of flat TPS cable in trunking and duct for the supply of socket outlets
- using flat TPS cable for lighting looms
- testing circuits to ensure they are safe and operate as intended

T4 Circular TPS wiring systems encompassing:

- Australian Standards requirements for the installation of circular TPS cable
- installation of circular TPS cables on cable ladder/tray
- installation of circular TPS cable
- testing circuits to ensure they are safe and operate as intended

T5 Thermoplastic insulated cables in non-metallic enclosures encompassing:

- Australian Standards requirements for the installation of non-metallic enclosures
- cutting and setting rigid non-metallic ducting, trunking and conduit and accessories

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REQUIRED SKILLS AND KNOWLEDGE

- installation of circuits using TPI cables in non-metallic enclosures
- testing circuits to ensure they are safe and operate as intended

T6 Thermoplastic insulated cables in metallic enclosures encompassing:

- Australian Standards requirements for the installation of metallic enclosures
- fitting metallic conduit to metallic trunking and accessories
- cutting, threading and setting metallic conduit
- installation of circuits using thermoplastic insulated cables in metallic conduit, ducting and trunking
- testing circuits to ensure they are safe and operate as intended

T7 Fire protection cabling and systems encompassing:

- Australian Standards requirements for the installation of fire protection cable and mineral insulated metal sheathed cables
- requirements when passing a wiring system through a fire rated wall or floor
- recognising different fire protection cable types including Pyrolex, Radox and MIMS
- termination of fire protection cable.
- installation of circuits using fire protection cable.
- testing circuits to ensure they are safe and operate as intended

T8 Steel wire armoured (SWA) cables encompassing:

- Australian Standards requirements for the installation of SWA cables
- identifying accessories used with SWA cables
- installation of circuits using SWA cables
- testing circuits to ensure they are safe and operate as intended

T9 Trailing cables and catenary systems encompassing:

- Australian Standards requirements for the installation of trailing cables and catenary wiring
- identifying equipment used with trailing cable and catenary systems
- installation of catenary wiring systems
- installation of trailing cable systems supplying pendant sockets
- testing the installation to ensure it is safe and operates as intended

Evidence Guide

EVIDENCE GUIDE

9) The evidence guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the

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EVIDENCE GUIDE

Range Statement and the Assessment Guidelines for this Training Package.

The Evidence Guide forms an integral part of this unit. It must be used in conjunction with all parts of this unit and performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

9.1)

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accordance with industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Sources of evidence need to be 'rich' in nature to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate

9.2)

Before the critical aspects of evidence are considered all prerequisites shall be met.

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EVIDENCE GUIDE

competency in this unit

Evidence for competence in this unit shall be considered holistically. Each element and associated performance criteria shall be demonstrated on at least two occasions in accordance with the 'Assessment Guidelines - UEE07'. Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the performance criteria and range statement
  - Apply sustainable energy principles and practices as specified in the performance criteria and range statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in this unit. It may be required by some jurisdictions that RTOs provide a percentile graded result for the purpose of regulatory or licensing requirements.
  - Demonstrate an appropriate level of skills enabling employment
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated consistent performance across a representative range of contexts from the prescribed items below:
  - Install wiring and accessories for low voltage circuits as described as described in 8) and including:

    A Selecting appropriate cable/cord and conductor devices

    B Cutting cable ends and stripping sheath/insulation to a sufficient length

    C Fitting and securing cable glands/retaining devices correctly

    D Preparing and terminating conducts to suit the type of terminal at which there are to be connected.

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EVIDENCE GUIDE

E Testing completed cables to ensure compliant continuity and insulation resistance

F Dealing with unplanned events

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

These should be part of the formal learning/assessment environment.

Note:

Where simulation is considered a suitable strategy for assessment, conditions must be authentic and as far as possible reproduce and replicate the workplace and be consistent with the approved industry simulation policy.

The resources used for assessment should reflect current industry practices in relation to installing wiring and accessories for low voltage circuits.

Method of assessment

9.4)

This unit shall be assessed by methods given in Volume 1, Part 3 'Assessment Guidelines'.

Note:
Competent performance with inherent safe working practices is expected in the industry to which this unit applies. This requires assessment in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

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Range Statement

RANGE STATEMENT

8) This relates to the unit as a whole providing the range of contexts and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

This unit shall be demonstrated by terminating at least five different types of cables each at a junction box and a device terminal enclosure.

Cable types with copper conductors:

- Thermoplastic insulated cable (TPI)
- Flat thermoplastic sheathed (TPS)
- Circular thermoplastic sheathed (TPS)
- Steel wire armoured (SWA)
- Mineral insulated metal sheathed (MIMS)
- Flexible cables
- Flexible cords
- Aluminium conductor/cable

AND

Terminate their conductors at each of the follow

Terminal types

- Tunnel terminal
- Stud terminal
- Screw terminal

Generic terms used throughout this Vocational Standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms that apply are given in Volume 2, Part 2.1.

Unit Sector(s)

Not Applicable

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Competency Field

2.2) Literacy and numeracy skills

Participants are best equipped to achieve competency in this unit if they have reading, writing and numeracy skills indicated by the following scales. Description of each scale is given in Volume 2, Part 3 'Literacy and Numeracy'

Reading	4	Writing	4	Numeracy	4

Custom Content Section

Competency Field **5)**

Electrical

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UEENEEG108A Trouble-shoot and repair faults in low voltage electrical apparatus and circuits

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This unit covers trouble-shooting and repairing faults in electrical apparatus and interconnecting circuits and equipment operating at voltages up to 1,000 V a.c. or 1,500 V d.c. It encompasses working safely, reading circuit diagrams, sketching diagrams from traced wiring, logically applying fault finding procedures, conducting repairs and completing the necessary service documentation.

Application of the Unit

Not Applicable

Licensing/Regulatory Information

1.2) License to practice

During Training: Competency development activities are subject to regulations directly related to licensing, occupational health and safety and where applicable contracts of training such as apprenticeships.

In the workplace: The application of the skills and knowledge described in this unit require a license to practice in the workplace where work is carried out on electrical equipment or installations which are designed to operate at voltages greater than 50 V a.c. or 120 V d.c.

Other conditions may apply under State and Territory legislative and regulatory requirements.

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Pre-Requisites

Prerequisite Unit(s) **2)**

2.1) Competencies

Granting competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

UEENEEE101A Apply Occupational Health and Safety regulations, codes and practices in the workplace

UEENEEE102A Fabricate, dismantle, assemble of electrotechnology components

UEENEEE104A Solve problems in d.c circuits

UEENEEE105A Fix and secure electrotechnology equipment

UEENEEE107A Use drawings, diagrams, schedules, standards, codes and specifications

UEENEEG006A Solve problems in single and three phase low voltage machines

UEENEEG033A Solve problems in single and three phase electrical apparatus and circuits

UEENEEG063A Arrange circuits, control and protection for general electrical installations

UEENEEG101A Solve problems in electromagnetic devices and related circuits

UEENEEG102A Solve problems in low voltage a.c. circuit

UEENEEG106A Terminate cables, cords and accessories for low voltage circuits

2.2) Further Information

For the full prerequisite chain details for this unit please refer to Table 2 in Volume 1, Part 2

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Employability Skills Information

Employability Skills **3)**

This unit contains Employability Skills

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Application of the Unit **4)**

4.1) General Application

This unit applies to all qualifications, competencies and/or Skill Sets which require an electrical license.

4.2) Importation

RTOs wishing to import this unit into any qualification under the flexibility provisions of NQC Training Package Policy

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a unit of competency

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Prepare to trouble-shoot and rectify faults.	1.1	The extent and nature of the electrical installation is determined from job specifications.
	1.2	Safety and other regulatory requirements to which the electrical installation shall comply area are identified, obtained and understood.
	1.3	OHS procedures for a given work area are identified, obtained and understood.

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ELEMENT		PERFORMANCE CRITERIA	
		1.4	OHS risk control measures and procedures in preparation for the work are followed.
		1.5	The likely extent of work to be undertaken is envisaged from fault/breakdown reports and/or discussions with appropriate person(s).
		1.6	Advice is sought from the work supervisor to ensure the work is coordinated effectively with others.
2	Trouble-shoot and repair faults.	2.1	OHS risk control measures and procedures for carrying out the work are followed.
		2.2	The need to test or measure live is determined in strict accordance with OHS requirements and when necessary conducted within established safety procedures.
		2.3	Circuits/machines/plant are checked as being isolated where necessary in strict accordance OHS requirements and procedures.
		2.4	Safety hazards resulting from the fault or breakdown are documented and risk control measures devised and implemented in consultation with appropriate personnel.
		2.5	Trouble-shooting is approached methodically drawing on knowledge of electrical circuits and apparatus using measured and calculated values of circuit/apparatus parameters.
		2.6	Circuit/apparatus components are dismantled where necessary and parts stored to protect them against loss or damage.
		2.7	Faulty circuits/components are rechecked and their fault status and acquired.
		2.8	Materials/replacement parts required to rectify faults are sourced and obtained in accordance with established procedures.
		2.9	Effectiveness of the repair is tested in accordance with established procedures.

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ELEMENT	PERFORMANCE CRITERIA	
	2.10	Apparatus is reassembled, finally tested and prepared for return to service.
	2.11	Unexpected situations are dealt with safely and with the approval of an authorised person.
	2.12	Trouble-shooting and repair activities are carried out without damage to apparatus, circuits, the surrounding environment or services and using sustainable energy practices.
3 Completion and report trouble-shoot and repair activities.	3.1	OHS work completion risk control measures and procedures are followed.
	3.2	Work area is cleaned and made safe in accordance with established procedures.
	3.3	Written justification is made for repairs to apparatus.
	3.4	Work completion is documented and an appropriate person or persons notified in accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of safe working practices and trouble-shooting and repairing faults in electrical apparatus and circuits.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

KS01-EG108A Electrical circuit and equipment faults and fault finding techniques

Evidence shall show an understanding of electrical circuit and equipment faults and fault finding techniques to an extent indicated by the following aspects:

T1 Troubleshooting concepts encompassing:

- need to understand the correct operation of a circuit or equipment, switching and control circuit arrangements.

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REQUIRED SKILLS AND KNOWLEDGE

- common faults with circuits and equipment including operator faults, incorrect connections, open-circuits, short-circuits, device faults (mechanical), supply faults.
- typical faults symptoms and their causes: operation of circuit protective device, appliance does not operate, single phase motor does not develop enough torque to drive the load, three phase motor does not develop enough torque to drive the load, motor overload trips
- factors to consider in clarifying the nature of a fault: initial fault report, confirmation of symptoms of the fault, comparison of symptoms with normal operation
- effect to cause reasoning — assumptions of possible causes
- methods for testing assumptions: visual inspection, component isolation, test equipment, sectional testing, split-half tests
- repairing the fault and the steps needed to ensure fault doesn't re-occur
- dealing with intermittent faults (typical causes of intermittent faults are vibration, shock, changes in temperature and electromagnetic interference).
- final testing and re commissioning

T2 Troubleshooting water heater and appliance circuits/equipment encompassing:

- circuit diagrams of common single phase and three phase hot water systems
- single phase and three phase element resistance values (determined from measurement and calculation from power and voltage ratings)
- testing single and three phase elements for correct insulation resistance and continuity
- element replacement techniques
- operation of thermostats, thermal cut-outs and pressure relief valves, flow switches and checking sacrificial anodes
- locating faults in common single and three phase hot water systems
- repairing faulty water heating systems

T3 Troubleshooting electrical appliance circuits/equipment encompassing:

- circuit diagrams of common single phase and three phase appliances
- methods to determine the cause of an RCD operation
- identification of appliances that is causing an RCD to trip
- testing single and three phase appliances for correct insulation resistance and continuity
- operation of appliances controls
- locating faults in common single and three phase appliances
- repairing faulty appliances

T4 Troubleshooting lighting circuits encompassing:

- circuit and wiring diagrams of common lighting circuits including single light controlled by a single switch, multiple lights controlled by a single switch, two and three way switching using the loop at the light method and the loop at the switch method.
- causes of wiring faults from supplied symptoms and circuit and/or wiring diagrams
- causes of faults in ELV lighting devices, include transformer (iron core or electronic), voltage drop, heat, over-voltage, poor connections, incompatible dimmers

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REQUIRED SKILLS AND KNOWLEDGE

- diagrams of a basic fluorescent light circuit including lamp, ballast and starter
- locating faults in fluorescent light circuits
- operation of a range of lighting control including passive infra-red (PIR), dimmers, photo electric or day-light switches and time clocks
- locating faults in lighting control circuits

T5 Troubleshooting single phase motor and control circuits encompassing:

- circuit diagrams of split phase, capacitor start, capacitor start capacitor run, universal and shaded pole single phase motors
- causes of single phase motor faults from supplied symptoms and circuit diagrams
- causes of electrical faults in single phase motors, include open and partially open circuit winding, short and partially short circuit winding, open circuit rotor, burnt out winding, coil shorted to frame.
- reasons for a thermal overload trip and how often they are to be reset before investigating a cause
- internal mechanical faults and their consequences, include bearings, fans, bent shaft, locked rotor, blocked air vents, centrifugal switches, environmental factors
- faults on driven loads and couplings and their consequences, include slipping belts, poorly aligned coupling (shims), vibration, loads bearing failing, load stalling.
- locating faults in single phase motors and their controls

T6 Troubleshooting three phase induction motor encompassing:

- circuit diagrams of three phase induction motors
- causes of three phase motor faults from supplied symptoms and circuit diagrams
- causes of electrical faults in three phase motors, include open and partially open circuit phase winding, short and partially short circuit phase winding, open circuit rotor, burnt out phase winding, coil shorted to frame.
- reasons for a thermal overload trip and how often they are to be reset before investigating a cause
- internal mechanical faults and their consequences, include bearings, fans, bent shaft, locked rotor, blocked air vents, environmental factors.
- faults on driven loads and couplings and their consequences, include slipping belts, poorly aligned coupling (shims), vibration, loads bearing failing, load stalling.
- locating faults in three phase induction motors and their controls

T7 Troubleshooting electrical installations encompassing:

- circuit diagrams, wiring diagrams, cable schedules and specifications of electrical installations
- causes of electrical installation faults from supplied symptoms and circuit diagrams include open and partially open circuit wiring, short and partially short circuit wiring, low insulation resistance, incorrect polarity, transposition of conductors, RCD tripping.
- locating faults in electrical installations
- repairing faulty electrical installation circuits components and wiring.

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Evidence Guide

EVIDENCE GUIDE

9) The evidence guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

The Evidence Guide forms an integral part of this unit. It must be used in conjunction with all parts of this unit and performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

9.1)

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accordance with industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Sources of evidence need to be 'rich' in nature to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

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EVIDENCE GUIDE

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all prerequisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated performance criteria shall be demonstrated on at least two occasions in accordance with the 'Assessment Guidelines - UEE07'. Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the performance criteria and range statement
  - Apply sustainable energy principles and practices as specified in the performance criteria and range statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in this unit . It may be required by some jurisdictions that RTOs provide a percentile graded result for the purpose of regulatory or licensing requirements.
  - Demonstrate an appropriate level of skills enabling employment
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated consistent performance across a representative range of contexts from the prescribed items below:
  - Find and repair faults in electrical apparatus and circuits as described as described in 8) and including:

    A Envisaging the likely extent of the fault and the work from fault/breakdown reports and/or discussion to elicit information on the fault/breakdown with appropriate person(s).

    B Using appropriate tools and resources, and methodical fault finding techniques.

    C Locating and trouble-shooting faults efficiently.

    D Conducting tests or measurements in strict accordance with OHS and electrical safe working

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EVIDENCE GUIDE

requirements.

E Rectifying faults effectively.

F Reporting cause of the fault and justifying the repairs undertaken.

G Dealing with unplanned events

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

These should be part of the formal learning/assessment environment.

Note:

Where simulation is considered a suitable strategy for assessment, conditions must be authentic and as far as possible reproduce and replicate the workplace and be consistent with the approved industry simulation policy.

The resources used for assessment should reflect current industry practices in relation to trouble-shooting and repairing faults in electrical apparatus and circuits.

Method of assessment

9.4)

This unit shall be assessed by methods given in Volume 1, Part 3 'Assessment Guidelines'.

Note:
Competent performance with inherent safe working practices is expected in the industry to which this unit applies. This requires assessment in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

For optimisation of training and assessment effort, competency development in this unit may be arranged concurrently with unit:

UEENEEG109A Develop and connect electrical control

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EVIDENCE GUIDE

circuits t

Range Statement

RANGE STATEMENT

8) This relates to the unit as a whole providing the range of contexts and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

This unit shall be demonstrated in trouble-shooting and repairing faults in electrical apparatus and circuits designed for voltages up to 1000 V a.c. or 1500 V d.c in at least:

Four of the following **equipment and associated circuit**

- Switchboards
- Protective devices
- Lighting
- Heating
- Socket outlets
- Control devices

and

Three of the following **machines and associated control circuits**

- Single phase motors
- Single phase motor controls
- Three phase motors
- Three phase motor controls
- Synchronous machines
- DC machines
- DC machines controls
- Transformers and auxiliary components

Notes.

1. The different types of faults include; Open-circuit; Short-circuit; Incorrect connections; Insulation failure; Unsafe condition; Apparatus/component failure; Related mechanical failure; Other electrical apparatus and circuit faults

2. Examples of apparatus are Control devices; Fixed appliances/accessories; Lighting; Single phase motors and their controls; Socket outlets Three phase motors and their controls, synchronous machines and their controls, transformers and their controls, switchboards and/or distribution boards and their controls, protection and/or metering

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RANGE STATEMENT

devices, a.c./d.c. machines and their controls other like equipment/accessories.

3. Examples of circuits include those supplying fixed appliances; lighting; single-phase motors; socket outlets; three phase motors and controls circuits; machines and transformers; electronic or computer based equipment other like equipment/accessories.

Generic terms used throughout this Vocational Standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms that apply are given in Volume 2, Part 2.1.

Unit Sector(s)

Not Applicable

Competency Field

2.2) Literacy and numeracy skills

Participants are best equipped to achieve competency in this unit if they have reading, writing and numeracy skills indicated by the following scales. Description of each scale is given in Volume 2, Part 3 'Literacy and Numeracy'

Reading	4	Writing	4	Numeracy	4

Custom Content Section

Competency Field **5)**

Electrical

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UEENEEG109A Develop and connect electrical control circuits

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor **1**)

1.1) Descriptor

This unit covers developing, connecting and functionally testing electrical power and control circuits that perform specific control functions. It encompasses working safely; developing schematic/ladder diagrams and converting them to wiring diagrams; selecting and connecting contactors and control devices to perform a specific function.

Application of the Unit

Not Applicable

Licensing/Regulatory Information

1.2) License to practice

During Training: Competency development activities are subject to regulations directly related to licensing, occupational health and safety and where applicable contracts of training such as apprenticeships.

In the workplace: The application of the skills and knowledge described in this unit require a license to practice in the workplace where work is carried out on electrical equipment or installations which are designed to operate at voltages greater than 50 V a.c. or 120 V d.c.

Other conditions may apply under State and Territory legislative and regulatory requirements.

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Pre-Requisites

Prerequisite Unit(s) **2)**

2.1) Competencies

Granting competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

UEENEEE101A Apply Occupational Health and Safety regulations, codes and practices in the workplace

UEENEEE102A Fabricate, dismantle, assemble of electrotechnology components

UEENEEE104A Solve problems in d.c circuits

UEENEEE105A Fix and secure electrotechnology equipment

UEENEEE107A Use drawings, diagrams, schedules, standards, codes and specifications

UEENEEG006A Solve problems in single and three phase low voltage machines

UEENEEG063A Arrange circuits, control and protection for general electrical installations

UEENEEG101A Solve problems in electromagnetic devices and related circuits

UEENEEG102A Solve problems in low voltage a.c. circuit

UEENEEG106A Terminate cables, cords and accessories for low voltage circuits

2.2) Further Information

For the full prerequisite chain details for this unit please refer to Table 2 in Volume 1, Part 2

Employability Skills Information

Employability Skills **3)**

This unit contains Employability Skills

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the

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qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Application of the Unit **4**)

4.1) **General Application**

This unit applies to all qualifications, competencies and/or Skill Sets which require an electrical license.

4.2) **Importation**

RTOs wishing to import this unit into any qualification under the flexibility provisions of NQC Training Package Policy

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a unit of competency

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Develop and prepare to connect electrical control circuits.	1.1 OHS procedures for a given work area are identified, obtained and understood.
	1.2 Established OHS risk control measures and procedures in preparation for the work are followed.
	1.3 Safety hazards, which have not previously been identified, are noted and established risk control measures are implemented.
	1.4 Control scenarios are determined from discussions with appropriate person(s) and documented in accordance with established procedures.
	1.5 Agreement for the control scenarios is sought from appropriate person(s) and documented in

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ELEMENT	PERFORMANCE CRITERIA	
		accordance with established procedures.
	1.6	Schematic arrangement of control circuits that complies with agreed scenarios is documented in accordance with established procedures.
	1.7	Materials needed to connect control circuits are obtained in accordance with established procedures and checked against job requirements.
	1.8	Tools, equipment and testing devices needed to connect control circuits are obtained in accordance with established procedures and checked for correct operation and safety.
	1.9	Preparatory work is checked to ensure no damage has occurred and complies with requirements.
2 Connect and test electrical control circuits.	2.1	OHS risk control measures and procedures for carrying out the work are followed.
	2.2	The need to test or measure live is determined in strict accordance with OHS requirements and when necessary conducted within established safety procedures.
	2.3	Circuits/machines/plant are checked as being isolated where necessary in strict accordance OHS requirements and procedures.
	2.4	Control circuit components are connected to comply with the agreed control scenario.
	2.5	Control circuit operation is tested for agreed functionality and in strict accordance with OHS requirements and established safety procedures.
	2.6	Non-compliant control functions are rectified to comply with the agreed control scenario.
	2.7	Unexpected situations are dealt with safely and with the approval of an authorised person.
	2.8	Control circuits are connected and tested efficiently without unnecessary waste of materials or damage to apparatus, circuits, the

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ELEMENT	PERFORMANCE CRITERIA	
		surrounding environment or services and using sustainable energy practice.
3 Completion and document circuit development activities.	3.1	OHS work completion risk control measures and procedures are followed.
	3.2	Work site is cleaned and made safe in accordance with established procedures.
	3.3	'As-connected' control circuits are documented using standard drawing conventions and an appropriate person or persons notified in accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of safe working practices and developing and connecting control circuits.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

KS01-EG109A Electrical control devices and circuits

Evidence shall show an understanding of electrical control devices and circuits to an extent indicated by the following aspects:

T1 Basic relay circuits encompassing:

- Identification of given circuit diagrams (schematic) symbols and explain the operation of the components represented
- labelling wires and terminal (numbering systems)
- control relay - operating principles, basic contact configurations and identification and common applications
- push button - switching configurations and common applications
- selecting pushbuttons/pilot lamps from manufacturer’s catalogues for specific applications
- development of simple stop-start relay circuit that incorporates pilot lights and latching circuit.

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REQUIRED SKILLS AND KNOWLEDGE

- connection and testing of control circuits

T2 Relay circuits and drawing conventions encompassing:

- circuit diagram drawing conventions
- selecting relays from manufacturers' catalogue for specified applications
- circuit development of electrical control circuit in accordance with a written description (specification) and list the sequence of operation of the circuit
- connecting simple electrical control circuit from circuit diagrams
- applying safe working practices when testing an electrical control circuit

T3 Remote STOP-START control and electrical interlocking encompassing:

- operation of local and remote start-stop control of relays
- operation of an electrically interlocked relay circuit
- development of a relay circuit incorporating local and remote start and stop buttons and electrical interlocking.
- connecting electrical circuits with local and remote start-stop control and with electrical interlocking.
- applying circuit checking and testing techniques to an electrical control circuit.

T4 Time delay relays encompassing:

- timers - operating principles, basic contact configurations and identification and common applications
- selecting timers for specified functions from manufactures' catalogues
- development of timer controlled circuits from a written description and list the sequence of circuit operation
- connecting a timer controlled circuit using a circuit diagram as a guide.
- timer circuit checking and testing procedures.

T5 Circuits using contactors encompassing:

- contactors - operating principles, basic contact configurations and identification and common applications
- thermal overloads - operating principles, basic contact configurations and identification and common applications
- circuit diagram symbols
- circuit development using a contactor
- using contactors for motor control.
- compliance requirements for devices for isolating circuits.

T6 Jogging and interlocking encompassing:

- purpose and application of jogging control of motors
- operation of motor control using start, stop and jog buttons
- purpose and application of electrical/mechanical interlocking
- developing a multiple motor starting circuit from a description of the circuit operation including jog and interlock functions.

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REQUIRED SKILLS AND KNOWLEDGE

- selecting circuit components using manufacturers' catalogues for appropriate duty ratings
- connecting and testing a multiple motor starting circuit which incorporates start, stop and jog control.

T7 Control devices encompassing:

- common control devices used in automatic control circuits: limit switches, proximity switches, photoelectric cells, pressure switches, float switches, light sensors and temperature sensors
- basic operating principles of common control devices
- advantages and disadvantages of common control devices
- applications for common control devices
- selecting control devices using manufacturers' catalogues for specified applications
- connection of control devices into control circuits

T8 Programmable relays encompassing:

- programmable relays - advantages over electromagnetic relay circuit control.
- typical applications of programmable relays.
- block diagram representation and basic operating principles
- input and output parameters, listing, connections and output types.
- connecting input and output devices to a programmable relay using a diagram
- basic programming of ladder circuits consisting of inputs, outputs i.e. stop-start circuit
- using the monitoring facility of the programmable relay to verify each ladder circuit operation.
- programming timers and using the monitoring facility of the programmable relay to check the values of the timer
- external devices
- implications of programming normally closed field devices
- conversion of control circuits
- installation of programmable control relays
- common faults and their symptoms

T9 Three-phase induction motor starters encompassing:

- reasons for limiting the starting current of large motors.
- requirements of the wiring rules (AS/NZS 3000) and the local supply authority service rules, with regard to starting and control of induction motors.
- DOL starter operating principles, applications and circuits
- electronic (soft) starter operating principles, applications and circuits
- connecting a DOL motor starter and testing the operation of the power and control circuits
- installation of DOL and soft starters

T10 Three-phase induction motor starters- reduced voltage encompassing:

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REQUIRED SKILLS AND KNOWLEDGE

- star-delta starter operating principles and circuits
- primary resistance starter operating principles and circuits
- auto-transformer starter operating principles and circuits
- secondary resistance starter operating principles and circuits
- common applications for each starter type
- comparison of motor starters basic characteristics
- selecting the most suitable motor starter for a given situation
- connecting motor starter power and control circuits for correct operation
- measuring starting current and torque of selected motor starters
- installation of reduced voltage starters

T11 Three-phase induction motor reversal and braking encompassing:

- reversing operating principles and control circuits
- plug braking operating principles and circuits
- dynamic braking operating principles and circuits
- regenerative braking operating principles and circuits
- eddy current brakes operating principles and circuits
- mechanical brakes operating principles and circuits
- comparison of the difference braking methods used.
- typical applications for each braking method.
- connecting a circuit with a braking feature to operate a three-phase motor.
- installation of motor braking control circuits

T12 Three-phase induction motor speed control encompassing:

- pole changing operating principles and circuits
- variable frequency drives operating principles and circuits
- slip-ring motors operating principles and circuits
- installation of motor speed controllers.

Evidence Guide

EVIDENCE GUIDE

9) The evidence guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

The Evidence Guide forms an integral part of this unit. It must be used in conjunction with all parts of this unit and performed in accordance with the Assessment Guidelines of this Training Package.

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EVIDENCE GUIDE

Overview of Assessment

9.1)

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accordance with industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Sources of evidence need to be 'rich' in nature to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all prerequisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated performance criteria shall be demonstrated on at least two occasions in accordance with the 'Assessment Guidelines - UEE07'. Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:

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EVIDENCE GUIDE

- Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the performance criteria and range statement
- Apply sustainable energy principles and practices as specified in the performance criteria and range statement
- Demonstrate an understanding of the essential knowledge and associated skills as described in this unit. It may be required by some jurisdictions that RTOs provide a percentile graded result for the purpose of regulatory or licensing requirements.
- Demonstrate an appropriate level of skills enabling employment
- Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures

- Demonstrated consistent performance across a representative range of contexts from the prescribed items below:
  - Develop and connect control circuits as described as described in 8) and including:

    A Determining control scenarios specifications.

    B Developing schematic arrangement of control circuits that meets the required scenario as specified.

    C Connecting control circuit to function as specified.

    D Conducting safety and functional testing correctly

    E Identifying and correcting non-compliant control functions.

    F Documenting 'as-connected' control circuit.

    G Dealing with unplanned events

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

These should be part of the formal learning/assessment environment.

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Note:

Where simulation is considered a suitable strategy for assessment, conditions must be authentic and as far as possible reproduce and replicate the workplace and be consistent with the approved industry simulation policy.

The resources used for assessment should reflect current industry practices in relation to development and connecting electrical control circuits.

Method of assessment

9.4)

This unit shall be assessed by methods given in Volume 1, Part 3 'Assessment Guidelines'.

Note:
Competent performance with inherent safe working practices is expected in the industry to which this unit applies. This requires assessment in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

For optimisation of training and assessment effort, competency development in this unit may be arranged concurrently with unit:

UEENEEG108B	Trouble-shoot and repair faults in low voltage electrical apparatus and circuits

Range Statement

RANGE STATEMENT

8) This relates to the unit as a whole providing the range of contexts and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

This unit shall be demonstrated in relation to developing, connecting and safety and functional testing on more than one occasion of at least four of the following control circuits:

- Multiple light switching circuit
- Master control circuit

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RANGE STATEMENT

- Single stop-start circuit
- Multiple stop-start circuit
- Time controlled circuit
- Machine interlocked circuit
- Motor jogging circuit
- Machine safety circuit

and,

using at least five of the following devices

- Multi-way switches
- Switches with more than two positions and Off
- Push buttons
- Electromechanical relays
- Programmable relays
- Contactors
- Reversing contactors
- Three phase starters
- Reduced voltage starters

and

with at least two of the following transducers/sensors:

- Timers
- Limit switches
- Proximity switches
- Photoelectric cells
- Pressure switches
- Float switches
- Light sensors
- Temperature sensors

Generic terms used throughout this Vocational Standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms that apply are given in Volume 2, Part 2.1.

Unit Sector(s)

Not Applicable

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Competency Field

2.2) Literacy and numeracy skills

Participants are best equipped to achieve competency in this unit if they have reading, writing and numeracy skills indicated by the following scales. Description of each scale is given in Volume 2, Part 3 'Literacy and Numeracy'

Reading	4	Writing	4	Numeracy	4

2.2) Literacy and numeracy skills

Competency Field **5)**

Electrical

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UEENEEG110A Find and repair faults in LV d.c. electrical apparatus and circuits

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit covers finding and repairing faults in electrical apparatus and interconnecting circuits and equipment operating at voltages up to 1,500 V d.c. It encompasses working safely, reading circuit diagrams, sketching diagrams from traced wiring, applying logical fault finding procedures, conducting repairs and completing the necessary service documentation.

Application of the Unit

Application of the Unit **2)**

This unit is intended for competency development entry-level employment based programs incorporated in approved contracts of training. It may also used to augment formally acquired competencies.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit require a license to practice in the workplace subject to regulations for undertaking of electrical work. Practice in workplace and during training is also subject to regulations directly related to occupational health and safety and where applicable contracts of training such as apprenticeships.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

UEENEEE101A	Apply Occupational Health and Safety regulations, codes and practices in the workplace
UEENEEE102A	Fabricate, dismantle, assemble of utilities components
UEENEEE104A	Solve problems in d.c circuits
UEENEEE105A	Fix and secure electrotechnology equipment
UEENEEE107A	Use drawings, diagrams, schedules, standards, codes and specifications
UEENEEG006A	Solve problems in single and three phase low voltage machines
UEENEEG033A	Solve problems in single and three phase electrical apparatus and circuits
UEENEEG063A	Arrange circuits, control and protection for general electrical installations
UEENEEG101A	Solve problems in electromagnetic devices and related circuits
UEENEEG102A	Solve problems in low voltage a.c. circuit
UEENEEG106A	Terminate cables, cords and accessories for low voltage circuits
UEENEEG108A	Trouble-shoot and repair faults in low voltage electrical apparatus and circuits

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Prerequisite Unit(s) **4)**

For the full prerequisite chain details for this unit please refer to Table 2 in Volume 1, Part 2

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve competency in this unit if they have reading, writing and numeracy skills indicated by the following scales. Description of each scale is given in Volume 2, Part 3 'Literacy and Numeracy'

Reading 4 Writing 4 Numeracy 4

Employability Skills Information

Employability Skills **5)**

This unit contains Employability Skills

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT **PERFORMANCE CRITERIA**

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ELEMENT	PERFORMANCE CRITERIA	
1 Prepare to find and rectify faults.	1.1	OHS procedures for a given work area are identified, obtained and understood.
	1.2	OHS risk control measures and procedures in preparation for the work are followed.
	1.3	The likely extent of work to be undertaken is envisaged from fault/breakdown reports and/or discussions with appropriate person(s).
	1.4	Advice is sought from the work supervisor to ensure the work is coordinated effectively with others.
	1.5	Sources of materials that may be required for the work are established in accordance with established procedures.
	1.6	Tools, equipment and testing devices needed to locate faults are obtained in accordance with established procedures and checked for correct operation and safety.
2 Find and repair faults.	2.1	OHS risk control measures and procedures for carrying out the work are followed.
	2.2	The need to test or measure live is determined in strict accordance with OHS requirements and when necessary conducted within established safety procedures.
	2.3	Circuits/machines/plant are checked as being isolated where necessary in strict accordance OHS requirements and procedures.
	2.4	Safety hazards resulting from the fault or breakdown are documented and risk control measures devised and implemented in consultation with appropriate personnel.
	2.5	Fault finding is approached methodically drawing on knowledge of d.c. circuit and apparatus using measured and calculated values of circuit/apparatus parameters.
	2.6	Circuit/apparatus components are dismantled where necessary and parts stored to protect them

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ELEMENT	PERFORMANCE CRITERIA	
		against loss or damage.
	2.7	Faulty circuits/components are rechecked and their fault status and acquired.
	2.8	Materials/replacement parts required to rectify faults are sourced and obtained in accordance with established procedures.
	2.9	Effectiveness of the repair is tested in accordance with established procedures.
	2.10	Apparatus is reassembled, finally tested and prepared for return to service.
	2.11	Unexpected situations are dealt with safely and with the approval of an authorised person.
	2.12	Fault finding and repair activities are carried out without damage to apparatus, circuits, the surrounding environment or services and using sustainable energy practices.
3 Completion and report fault finding and repair activities.	3.1	OHS work completion risk control measures and procedures are followed.
	3.2	Reusable, faulty or worn components are tagged and dispatched for repair to maintain adequate spares.
	3.3	Maintenance work activities are documented in accordance with established procedures. Note. Examples of documentation are component faults reports, test results, authorisations, permits, parts/component dispatch and stores records.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this

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REQUIRED SKILLS AND KNOWLEDGE

unit.

Evidence shall show that knowledge has been acquired of safe working practices and finding and repairing faults in LV d.c. electrical apparatus and circuits.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

KS01-EG110A Direct current machines and controls

Evidence shall show an understanding of d.c. motor control methods to an extent indicated by the following aspects:

T1 Direct current machines encompassing:

- Purpose, types and applications
- Operating principles
- Installation and starting/running requirements and limitations
- Connection arrangements
- Typical fault symptoms and related conditions

T2 Direct current motor starters and their operating principles encompassing:

- back emf
- series-lockout
- timed starters
- electronic controllers

T3 Power and control connection arrangements encompassing:

- Built-in stop/start control
- Remote stop/start control
- Overload protection
- Interlocking with other starters and controls

T4 Braking methods encompassing:

- Dynamic,
- Plugging,
- Electromechanical, and
- Regenerative.

T5 Speed control methods encompassing:

- Field control
- Rheostatic control
- Voltage control

T6 Protection of d.c. motors

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Evidence Guide

EVIDENCE GUIDE

9) The evidence guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

The Evidence Guide forms an integral part of this unit. It must be used in conjunction with all parts of this unit and performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accordance with industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Sources of evidence need to be 'rich' in nature to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and

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developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all prerequisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated performance criteria shall be demonstrated on at least two occasions in accordance with the 'Assessment Guidelines – UEE11'. Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the performance criteria and range statement
  - Apply sustainable energy principles and practices as specified in the performance criteria and range statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in this unit. It may be required by some jurisdictions that RTOs provide a percentile graded result for the purpose of regulatory or licensing requirements.
  - Demonstrate an appropriate level of skills enabling employment
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated consistent performance across a representative range of contexts from the prescribed items below:
  - Find and repair faults in d.c. electrical apparatus and circuits as described in 8) and including:

A Envisaging the likely extent of work from fault/breakdown

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reports and discussion with appropriate person(s).

B Using methodical fault finding techniques.

C Finding faults efficiently.

D Rectifying faults effectively.

E Completing documentation correctly.

F Dealing with unplanned events by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

OHS policy and work procedures and instructions.

Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

These should be part of the formal learning/assessment environment.

Note:

Where simulation is considered a suitable strategy for assessment, conditions must be authentic and as far as possible reproduce and replicate the workplace and be consistent with the approved industry simulation policy.

The resources used for assessment should reflect current industry practices in relation to finding and repairing faults in d.c. electrical apparatus and circuits.

Method of assessment

9.4)

This unit shall be assessed by methods given in Volume 1, Part 3 ‘Assessment Guidelines’.

Note:

Competent performance with inherent safe working practices is expected in the industry to which this unit applies. This requires

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assessment in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

For optimisation of training and assessment effort, competency development in this unit may be arranged concurrently with unit:

UEENEEG10 Develop and connect electrical control circuits 9A

Range Statement

RANGE STATEMENT

10) This relates to the unit as a whole providing the range of contexts and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

This unit shall be demonstrated in relation to finding and repairing faults and their cause in d.c. electrical apparatus and circuits. Finding and repairing fault types in electrical apparatus and interconnecting circuits and equipment operating at voltages up to d.c include the following:

- Open-circuit
- Short-circuit
- Incorrect connections
- Insulation failure
- Unsafe condition
- Apparatus/component failure
- Related mechanical failure
- Other electrical apparatus and circuit faults
- Any five of the above shall apply.

Note:

1. Examples of apparatus are d.c switchboards/distribution boards, protective devices such as circuit breakers and fuses, and d.c machines and associated control devices.

2. Examples of circuits include those related to d.c. apparatus; d.c machines

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RANGE STATEMENT

and controls circuits.

Generic terms used throughout this Vocational Standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms that apply are given in Volume 2, Part 2.1.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Electrical

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UEENEEG111A Carry out basic repairs to electrical components and equipment

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals with the repair and/or replacement of mechanical and electrical components of electrical apparatus. It encompasses safe working practices, following written and oral instruction and procedures, basic testing and techniques for dismantling and assembling apparatus and disconnecting and reconnecting components

Application of the Unit

Application of the Unit **2)**

This unit may apply to persons entering work in electrotechnology and may be used in school based vocational programs.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a license to practice in the workplace provided equipment is not connected to installation wiring at voltage above 50 V a.c. or 120 V d.c. However, practice in this unit is subject to regulations directly related to occupational health and safety and where applicable contracts of training such as apprenticeships.

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License to practice **3)**

Note:

1. Compliance with permits may be required in various jurisdictions and typically relates to the operation of plant, machinery and equipment such as elevating work platforms, powder operated fixing tools, power operated tools, vehicles, road signage and traffic control and lifting equipment. Permits may also be required for some work environments such as confined spaces, working aloft, near live electrical apparatus and site rehabilitation.

2. Compliance may be required in various jurisdictions relating to currency in First Aid, confined space, lifting and risk safety measures.

Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

UEENEEE101A	Apply Occupational Health and Safety regulations, codes and practices in the workplace
UEENEEE102A	Fabricate, assemble and dismantle utilities industry components

For the full prerequisite chain details for this unit please refer to Table 2 in Volume 1, Part 2

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve competency in this unit if they have reading, writing and numeracy skills indicated by the following scales. Description of each scale is given in Volume 2, Part 3 ‘Literacy and Numeracy’

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Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

This unit contains Employability Skills

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare to repair electrical apparatus.	1.1 OHS procedures for a given work area are obtained and understood through established routines and procedures.
	1.2 Established OHS risk control measures and procedures in preparation for the work are followed.
	1.3 The nature of the repair is obtained from documentation or from work supervisor to establish the scope of work to be undertaken.
	1.4 Advice is sought from the work supervisor to ensure the work is coordinated effectively with others.

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ELEMENT	PERFORMANCE CRITERIA	
	1.5	Sources of materials that may be required for the work are established in accordance with established routines and procedures.
	1.6	Tools, apparatus and testing devices needed to carry out the work are obtained and checked for correct operation and safety.
2 Repair electrical apparatus.	2.1	Established OHS risk control measures and procedures for carrying out the work are followed.
	2.2	The need to test or measure live is determined in strict accordance with OHS requirements and when necessary conducted within established safety procedures.
	2.3	Circuits/apparatus are checked as being isolated where necessary in strict accordance OHS requirements and procedures.
	2.4	Apparatus is dismantled in accordance with manufacturer's guide and supervisor's instructions.
	2.5	Component parts are tagged during the dismantling to help ensure correct and efficient reassembly and stored to protect them against loss or damage.
	2.6	Repairs are affected efficiently without damage to other components, apparatus or circuits.
	2.7	Apparatus is assembled in an appropriate sequence with all components parts placed, secured and connected in accordance with manufacturer's guide or industry practice.
	2.8	Procedures for referring non-routine events to immediate supervisor for directions are followed.
	2.9	Repairs are carried out efficiently without unnecessary waste of materials or damage to apparatus and the surrounding environment or services and using sustainable energy

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ELEMENT	PERFORMANCE CRITERIA	
		practices.
3 Complete and report repair work activities.	3.1	OHS work completion risk control measures and procedures are followed.
	3.2	Repaired apparatus is prepared and forwarded to appropriate person(s) for testing.
	3.3	Work area is cleaned and made safe in accordance with established procedures.
	3.4	Work supervisor is notified of the completion of the repair work in accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of safe working practices and carrying out basic repairs to electrical apparatus.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

KS01-EG111A Electrical basic equipment repair

Evidence shall show an understanding of electrical workshop and metal cutting and an ability to carry out those activities to an extent indicated by the following aspects:

T1 Basic cable and conductor terminations encompassing:

- Insulation removal and replacement
- General aspects and soldering involving pins on electronic components and stranded conductors carrying current up to 25 amperes.
- Application of connecting devices for conductors and terminals
- Continuity through connections and insulation resistance testing
- Stress release on cables/conductors

T2 Electrical workshop machines encompassing:

- Fixed position power tools

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REQUIRED SKILLS AND KNOWLEDGE

- Tooling used on drilling machines
- Twist drills features, sharpening and faults
- Drilling operations
- Off hand grinding safety and machine set up

T3 Principles of metal cutting encompassing:

- Factors influencing the action of cutting tools
- Principles of chip formation
- Effects of cutting tool geometry
- Effects of coolants and cutting fluids

T4 Selection of cutting tools encompassing:

- Factors influencing tool selection
- Cutting tool materials
- Turning cutting tool design
- Milling cutting tool design
- Principles of chip control
- Identification and selection of carbides

T5 Metal cutting conditions encompassing:

- Conditions under which tools cut best
- Determining cutting data

T6 Cutting tool defects encompassing:

- Identification of types of tool failures
- Causes of tool failure

T7 Overcoming causes of tool failure

Evidence Guide

EVIDENCE GUIDE

9) The evidence guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

The Evidence Guide forms an integral part of this unit. It must be used in conjunction with all parts of this unit and performed in accordance with the Assessment Guidelines of this Training Package.

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Overview of Assessment

9.1)

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accordance with industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Sources of evidence need to be 'rich' in nature to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all

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prerequisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated performance criteria shall be demonstrated on at least two occasions in accordance with the 'Assessment Guidelines – UEE11'. Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the performance criteria and range statement
  - Apply sustainable energy principles and practices as specified in the performance criteria and range statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in this unit. It may be required by some jurisdictions that RTOs provide a percentile graded result for the purpose of regulatory or licensing requirements.
  - Demonstrate an appropriate level of skills enabling employment
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated consistent performance across a representative range of contexts from the prescribed items below:
  - Carry out basic repairs to electrical apparatus as described as described in 8) and including:

A Following manufactures service instructions for access to components.

B Removing at least three different types of components specified in the work instructions.

C Replacing components to manufacturer's requirements.

D Terminating internal wiring correctly.

E Reassembling the apparatus correctly.

F Testing apparatus operation.

G Dealing with unplanned events by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Note:

Successful completion of relevant vendor training may be used to

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contribute to evidence on which competency is deemed. In these cases the alignment of outcomes of vendor training with performance criteria and critical aspects of evidence shall be clearly identified.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

OHS policy and work procedures and instructions.

Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Resources required to assess this unit are listed above in Context of assessment', which should also be used in the formal learning/assessment environment.

Note:

Where simulation is considered a suitable strategy for assessment, conditions must be authentic and as far as possible reproduce and replicate the workplace and be consistent with the approved industry simulation policy.

The resources used for assessment should reflect current industry practices in relation to carrying out basic repairs to electrical apparatus.

Method of assessment

9.4)

This unit shall be assessed by methods given in Volume 1, Part 3 'Assessment Guidelines'.

Note:

Competent performance with inherent safe working practices is expected in the industry to which this unit applies. This requires assessment in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

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Concurrent assessment and relationship with other units **9.5)**

For optimisation of training and assessment effort, competency development in this unit may be arranged concurrently with unit:

UEENEEE102A	Fabricate, assemble and dismantle utilities industry components

The critical aspects of occupational health and safety covered in unit UEENEEE101A and other discipline specific occupational health and safety units shall be incorporated in relation to this unit.

Range Statement

RANGE STATEMENT

10) 8) This relates to the unit as a whole providing the range of contexts and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

This unit shall be demonstrated in relation to carrying out basic repairs electrical apparatus limited to replacement or repair of components in which the fault has been previously established. This shall include at least two different electrical apparatus in which three different types of components are faulty one of which requires disconnecting and reconnecting internal wiring to affect repairs.

Generic terms used throughout this Vocational Standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms that apply are given in Volume 2, Part 2.1.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Electrical

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UEENEEG116A Diagnose and rectify faults in traction lift systems

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit covers diagnosing and rectifying faults in traction lift systems and equipment. It encompasses working safely, replacing and/or adjustment of lift circuit and associated components, diagnosing and repairing of faults in lift circuits and associated components (including governors, brakes, safety gear, safety devices, lift machines, door components and controllers) and releasing passengers from lifts which have become immobilised.

Application of the Unit

Application of the Unit **2)**

This unit applies to any formal recognition for this standard at the aligned AQF 3 level or higher.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit require a license to practice in the workplace where plant and equipment operate at voltage above 50 V a.c. or 120 V d.c. However other conditions may apply in some jurisdictions subject to regulations related to electrical work. Practice in the workplace and during training is also subject to regulations directly related to occupational health and safety and where applicable contracts of

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License to practice **3)**

training such as apprenticeships.

Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

UEENEEE101A	Apply Occupational Health and Safety regulations, codes and practices in the workplace
UEENEEE102A	Fabricate, dismantle, assemble of utilities components
UEENEEE104A	Solve problems in d.c circuits
UEENEEE105A	Fix and secure electrotechnology equipment
UEENEEE107A	Use drawings, diagrams, schedules, standards, codes and specifications
UEENEEG006A	Solve problems in single and three phase low voltage machines
UEENEEG033A	Solve problems in single and three phase electrical apparatus and circuits
UEENEEG063A	Arrange circuits, control and protection for general electrical installations
UEENEEG101A	Solve problems in electromagnetic devices and related circuits
UEENEEG102A	Solve problems in low voltage a.c. circuit
UEENEEG106A	Terminate cables, cords and accessories for low voltage circuits

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Prerequisite Unit(s) **4)**

UEENEEG108A	Trouble-shoot and repair faults in low voltage electrical apparatus and circuits

For the full prerequisite chain details for this unit please refer to Table 2 in Volume 1, Part 2

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve competency in this unit if they have reading, writing and numeracy skills indicated by the following scales. Description of each scale is given in Volume 2, Part 3 ‘Literacy and Numeracy’

Reading	4	Writing	4	Numeracy	5

Employability Skills Information

Employability Skills **5)**

This unit contains Employability Skills

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare to diagnose and rectify faults.	1.1 OHS procedures for a given work area are identified, obtained and understood.
	1.2 OHS risk control measures and procedures in preparation for the work are followed.
	1.3 The likely extend of work to be undertaken is envisaged from maintain procedures or fault/breakdown reports and/or discussions with appropriate person(s).
	1.4 Advice is sought from the work supervisor to ensure the work is coordinated effectively with others.
	1.5 Tools, equipment and testing devices needed to carry out the work are obtained in accordance with established procedures and checked for correct operation and safety.
2 Diagnose and rectify faults.	2.1 OHS risk control measures and procedures for carrying out the work are followed.
	2.2 The need to test or measure live is determined in strict accordance with OHS requirements and when necessary conducted within established safety procedures.
	2.3 Circuits/machines/plant are checked as being isolated where necessary in strict accordance OHS requirements and procedures.
	2.4 Safety hazards resulting from the fault or breakdown are documented and risk control measured and devised and implemented in consultation with appropriate personnel.
	2.5 Logical diagnostic methods are applied to diagnose lift system apparatus faults employing measurements and estimations of system operating parameters referenced to system operational requirements.
	2.6 Suspected fault scenarios are tested as being the cause(s) of system fault.

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ELEMENT	PERFORMANCE CRITERIA	
	2.7	Cause of the fault is identified and appropriately competent persons are engaged to rectify the fault where it is outside the scope of the lift systems.
	2.8	Faults in the lift components of the system are rectified to raise apparatus and system to its operational standard.
	2.9	System is tested to verify that the system operates as intended and to specified requirements
	2.10	Methods for dealing with unexpected situations are selected on the basis of safety and specified work outcomes.
	2.11	Diagnosis and rectification activities are carried out efficiently without unnecessary waste of materials or damage to apparatus and the surrounding environment or services and using sustainable energy practices.
3 Completion and report fault diagnosis and rectification activities	3.1	OHS work completion risk control measures and procedures are followed.
	3.2	Reusable, faulty or worn components are tagged and dispatched for repair to maintain adequate spares.
	3.3	Rectification of faults is documented in accordance with established procedures. Note. Examples of documentation are components fault reports, test results, authorisations, permits, parts/component dispatch and store records
	3.4	Appropriate person or persons notified, in accordance with established procedures, that the system faults have been rectified.

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of safe working practices and diagnosing and rectifying faults in lifts systems.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

KS01-EG116A Traction lift systems

Evidence shall show an understanding of the operation of the various types of lifts and the emergency procedures for the release of trapped passengers to an extent indicated by the following aspects:

T1 Technical standards, regulations and codes for lifts and escalators encompassing:

- Lift Code
- Australian Standards relevant to lift systems

T2 Lift systems – drive types, construction and operation of passenger, goods and service lifts encompassing:

- Drive types
- Drive constructions
- Drive operations
- Single and team manual handling
- Communication on site
- Emergency procedures
- Passenger
- Goods
- Service

T3 Lift machine room encompassing:

- access
- Machine
- Controller
- Governor
- Floor selector

T4 Lift well equipment encompassing:

- Guide rails
- Landing doors and locks
- Limit switches/operating devices
- Ropes

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REQUIRED SKILLS AND KNOWLEDGE

- Roping systems
- Counterweights

T5 Lift pit encompassing:

- access
- Buffers
- Compensators
- Safety equipment

T6 Lift car encompassing:

- access
- Frame
- Superstructure
- Door operator
- Travelling cable
- Buttons and indicators
- Communication devices
- Safety gear

T7 Lift control circuits using relay logic encompassing:

- Button circuit
- Indicator/lantern circuit
- Key switch circuits
- Fans
- Mains supply
- Power circuits
- Floor selector circuitry
- Motor room control (selector)
- Well control (transducer)
- Directional circuitry
- Slowing and stopping circuitry
- Re-levelling circuitry
- Door operator circuitry
- Acceleration circuits

T8 Lift safety circuits encompassing:

- Landing door locks
- Car door locks
- Emergency stop
- Pit switch
- Car trap-door limit switch
- Fire service

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REQUIRED SKILLS AND KNOWLEDGE

- Car top switch
- Tappet switch
- Governor/switch
- Safety gear switch
- Reverse phase relay
- Phase failure relay
- Overloads
- Circuit breakers
- Limit switches
- Terminal stopping
- Door protection
- Circuit switches

T9 Lift components - electro-mechanical employing relay logic encompassing:

- Button circuit
- Indicator/lantern circuit
- Key switch circuits
- Fans
- Mains supply
- Power circuits
- Floor selector circuitry
- Motor room control (selector)
- Well control (transducer)
- Directional circuitry
- Slowing and stopping circuitry
- Re-levelling circuitry
- Door operator circuitry
- Acceleration circuits

T10 Lift components - electro-mechanical safety circuits encompassing:

- Landing door locks
- Car door locks
- Emergency stop
- Pit switch
- Car trap-door limit switch
- Fire service
- Car top switch
- Tappet switch
- Safety gear switch
- Terminal stopping
- Circuit switches are all highlighted

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REQUIRED SKILLS AND KNOWLEDGE

T11 Lift components - electronic encompassing:

- Encoders
- Transducers
- Electronic boards
- Selectors
- Rectifiers
- Capacitors
- Resistors
- Processor board
- I/O board

T12 Lift components – electrical encompassing:

- Relays; reverse phase and phase failure
- Tachos
- Limit switches
- Brushes
- Selectors
- Motor/generator
- Transformers
- Fuses
- Lamps
- Terminals

T13 Lift electrical layout and special requirements encompassing:

- Lift Code and AS 3000 requirements
- Special lift symbols
- Conduits
- Travelling cable
- Troughing
- Colour coding and labelling
- Segregation LV/ELV
- Communication cabling

T14 Traction encompassing:

- Speed/load characteristics
- Efficiency
- Application
- Brakes
- Electric prime mover (motor types and control)

T15 Geared types including rack and pinion and chain encompassing:

- Speed/load characteristics

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REQUIRED SKILLS AND KNOWLEDGE

- Efficiency
- Application
- Brakes
- Electric prime mover (motor types and control)
- Drum

T16 Electric lifts – mechanics encompassing:

- Governors Governor types including; vertical shaft, overspeed devices, horizontal shaft
- Governor operation testing and rope tension testing
- Safety gear Types; A instantaneous, B flexible guide clamp, C wedge clamp and D oil buffer
- Release procedures for each type of safety gear/governor combination
- Statutory requirements

T17 Maintenance, replacement and adjustment of mechanical lift components encompassing:

- Air cords
- Selectors
- Bearings; roller, sleeve, guide shoes, and slipper
- Door guides
- Landing doors
- Car doors
- Tapes/chains

T18 Brake types, function, operation, inspection and adjustment, circuitry, manual release and statutory requirements encompassing:

- Geared machine brakes
- Gearless machine brakes
- Brake function and statutory requirements
- Internal and external mechanical brakes
- Electrical operations including; stall motor, solenoid and hydraulic
- inspection and adjustment of mechanical and electrical brakes
- Brake circuitry
- Manual release devices and safe procedures
- Statutory requirements

T19 Electro-hydraulic lifts circuitry, controls and components encompassing:

- Electrical circuitry
- Pump motor, starter
- Governor switch
- Over travel limits
- Up, down solenoids

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REQUIRED SKILLS AND KNOWLEDGE

- Up, down limit switches
- Levelling switch
- Stop button
- Faulty components diagnosis
- Hydraulic components
- Hydraulic circuitry
- Servicing

T20 Electro-hydraulic lifts - mechanical operation – fluid power principles and components, operation, arrangements, lift code and other requirements and emergency passenger release encompassing:

- Fluids
- Hydraulics
- Pascal's Law
- Safety considerations of fluids under pressure
- Pump
- Control of hydraulic pressure
- Solenoid values
- Directional flow including pressure gauge
- Ram/cylinders, including single and multi stage
- Oil cooler
- Oil reservoir
- Filters
- Seals
- Bleeding lines
- General operation
- Types of arrangements including; side acting, direct and suspended
- Requirements of Lift Code/Standards including; viewing communication windows, labelling circuit breakers, head room/top of car, pump installation under car, anti-creep devices and closing of landing doors

T21 Emergency release procedures - trapped passengers – OHS considerations and communication with passengers encompassing:

- Enterprise requirements and procedures
- Passenger safety
- Moving under power
- Hand winding
- Determining numbers and condition of passengers
- Direction of lift travel before stopping
- Fault indication
- Status of doors
- Warnings about using controls

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REQUIRED SKILLS AND KNOWLEDGE

- Warnings about standing near doors
- Information related to impending movement
- Information relating to opening of doors
- Reassurance as to safety of passengers
- Emergency medical support

T22 Escalators and moving walks components encompassing:

- Machine Brakes
- Controller
- Safety devices
- Balustrade lighting
- Steps/pallets/belts
- Hand rail
- Drive chain
- Truss
- Track systems
- Step/pallet chains
- Rollers, Tension carriage
- Hand rail earthing

Evidence Guide

EVIDENCE GUIDE

9) The evidence guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

The Evidence Guide forms an integral part of this unit. It must be used in conjunction with all parts of this unit and performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment	**9.1)**
	Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment

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is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accordance with industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Sources of evidence need to be 'rich' in nature to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all prerequisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated performance criteria shall be demonstrated on at least two occasions in accordance with the 'Assessment Guidelines – UEE11'. Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:

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- Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the performance criteria and range statement
- Apply sustainable energy principles and practices as specified in the performance criteria and range statement
- Demonstrate an understanding of the essential knowledge and associated skills as described in this unit. It may be required by some jurisdictions that RTOs provide a percentile graded result for the purpose of regulatory or licensing requirements.
- Demonstrate an appropriate level of skills enabling employment
- Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures

- Demonstrated consistent performance across a representative range of contexts from the prescribed items below:
  - Diagnose and rectify faults in lift systems as described as described in 8) and including:

A Governors.

B Brakes.

C Safety gear.

D Safety devices.

E Lift machines.

F Door components.

  - Replace and/or adjustment of lift equipment in at least three types of lift equipment as described below

A Electro-hydraulic lift.

B Electric traction lift.

C Passenger lift.

D Goods lift.

E Dealing with unplanned events by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Note:

Successful completion of relevant vendor training may be used to contribute to evidence on which competency is deemed. In these cases the alignment of outcomes of vendor training with performance criteria and critical aspects of evidence shall be clearly identified.

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Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

OHS policy and work procedures and instructions.

Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

These should be part of the formal learning/assessment environment.

Note:

Where simulation is considered a suitable strategy for assessment, conditions must be authentic and as far as possible reproduce and replicate the workplace and be consistent with the approved industry simulation policy.

The resources used for assessment should reflect current industry practices in relation to diagnosing and rectifying faults in lifts systems.

Method of assessment

9.4)

This unit shall be assessed by methods given in Volume 1, Part 3 ‘Assessment Guidelines’.

Note:

Competent performance with inherent safe working practices is expected in the industry to which this unit applies. This requires assessment in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

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For optimisation of training and assessment effort, competency development in this unit may be arranged concurrently with unit:

UEENEEG108A	Trouble-shoot and repair faults in low voltage electrical apparatus and circuits

Range Statement

RANGE STATEMENT

10) This relates to the unit as a whole providing the range of contexts and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

Competency shall be demonstrated in relation to diagnosing and rectifying faults in lift circuits and associated components for at least three (3) types of lift circuits/components as listed:

- Governors
- Brakes
- Safety gear
- Safety devices
- Lift machines
- Door components
- Controllers
- Release passengers from a lift, which has become immobilised

Generic terms used throughout this Vocational Standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms that apply are given in Volume 2, Part 2.1.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Electrical

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UEENEEG129A Overhaul and repair major switchgear and controlgear

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit covers the overhauling and repairing switchgear/controlgear rated in excess of 20 kA. It requires the ability to establish and document the level of work required, arranging for the overhaul/repair to be carried out, verify compliance of overhauled/repaired switchgear/controlgear and complete the necessary documentation.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment previously acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit require a license to practice in the workplace where plant and switchgear/control gear operate at voltage above 50 V a.c. or 120 V d.c. Other conditions related to communications, electrical work, fire protection, gas work, high voltage work, refrigeration/air conditioning and security may apply in some jurisdictions subject to regulations. Practice in the workplace and during training is also subject to

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License to practice **3)**

regulations directly related to occupational health and safety and where applicable contracts of training such as apprenticeships.

Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

UEENEEE101A	Apply Occupational Health and Safety regulations, codes and practices in the workplace
UEENEEE102A	Fabricate, dismantle, assemble of utilities components
UEENEEE104A	Solve problems in d.c circuits
UEENEEE105A	Fix and secure electrotechnology equipment
UEENEEE107A	Use drawings, diagrams, schedules, standards, codes and specifications
UEENEEG111A	Carry out basic repairs to electrical components and equipment
UEENEEG164A	Repair and maintain mechanical components of electrical machines

For the full prerequisite chain details for this unit please refer to Table 2 in Volume 1, Part 2

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve competency in

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this unit if they have reading, writing and numeracy skills indicated by the following scales. Description of each scale is given in Volume 2, Part 3 'Literacy and Numeracy'

Reading 4 Writing 4 Numeracy 4

Employability Skills Information

Employability Skills **5)**

This unit contains Employability Skills

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare for overhaul/repair of switchgear/control gear.	1.1 OHS processes and procedures for a given work area are identified, obtained and understood.
	1.2 Established OHS risk control measures and procedures in preparation for the work are followed.
	1.3 Safety hazards that have not previously been identified are noted and established risk control measures are implemented.

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ELEMENT	PERFORMANCE CRITERIA	
	1.4	Instructions on the extent of overhaul and/or repair are received and expected outcomes of the work acquired with appropriate personnel.
	1.5	Appropriate personnel are consulted to ensure the work is coordinated effectively with others involved on the work site.
	1.6	Switchgear/control gear service and repair documentation is read and understood.
	1.7	Sources of materials that may be required for the work are established in accordance with established procedures.
	1.8	Tools, equipment and testing devices needed to work are obtained in accordance with established procedures and checked for correct operation and safety.
2 Overhaul switchgear/control gear.	2.1	OHS risk control measures and procedures for carrying out the work are followed.
	2.2	The need to test or measure live is determined in strict accordance with OHS requirements and when necessary conducted within established safety procedures.
	2.3	Circuits/machines/plant are checked as being isolated where necessary in strict accordance OHS requirements and procedures.
	2.4	Switchgear and control gear is dismantled and parts tagged and stored to prevent loss or damage.
	2.5	The state of switchgear/control gear components is determined by measurements, tests and inspections and results recorded.
	2.6	Materials/replacement parts required to complete the work are sourced and obtained in accordance with established procedures.
	2.7	Effectiveness of the repairs is tested in accordance with established procedures.

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ELEMENT	PERFORMANCE CRITERIA	
	2.8	Specifications and instructions for the overhaul/repair work are documented in accordance with requirements.
3 Document overhaul/repair work.	3.1	OHS work completion risk control measures and procedures are followed.
	3.2	Reusable, faulty or worn components are tagged and dispatched for repair to maintain adequate spares.
	3.3	Overhaul/repair work is documented in accordance with requirements stating that the switchgear/control gear complies with the overhaul specifications.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of safe working practices and overhauling and repairing major switchgear/controlgear.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

KS01-EG129A Switchgear and controlgear – 20 kA

Evidence shall show an understanding of the switchgear and controlgear to an extent indicated by the following aspects:

T1 Types and applications of switchgear and controlgear

T2 Operating principles of switchgear and controlgear

T3 Interlocking systems encompassing:

- external interlocking systems such as Castell Key systems
- internal interlocking systems for either safety or that operate in conjunction with say Castell Key systems

T4 Control and protection of switchgear and controlgear

T5 Installation requirements encompassing:

- operating specifications for equipment

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REQUIRED SKILLS AND KNOWLEDGE

- areas requiring repairs and maintenance
- determining if repairs/maintenance are to be carried in situ or in workshop environment
- relevant legislation and Standards applicable to the installation
- OHS issues with regard to removing/ re-installing heavy equipment
- electrical safety issues with regard to removing/ re-installing equipment
- understanding of CFC units

T6 Electrical switchgear and controlgear protection methods encompassing:

- understanding of the operation of switchgear when it opens under load
- understanding on the settings and operation required for both magnetic short-circuit and thermal overload with equipment
- determining the earth fault loop impedance requirements required to keep touch voltage values within requirements
- thermal imaging techniques
- time/current curves from manufacturers specifications
- equipment to safely test switchgear after repairs or maintenance
- effectiveness of arc suppression installed within the equipment
- modern types of switchgear that are computer controlled and programmed
- modern types of switchgear that are interconnected to other protective devices
- certification process for any repair or maintenance work performed
- phase-failure systems
- Verifying the correct fault-level for the installation is consistent with the kA rating of the equipment
- x-ray and ultrasonic detection systems with regard to metallurgy
- different types of lubricants required for different locations, temperatures and humidity

T7 Electrical safe working practices of working safely on or around electrical equipment encompassing:

- determining safe working Standards and codes of practice for equipment and installations over 20 kA
- OHS requirements for equipment and installations over 20 kA
- working knowledge of operating within the vicinity of live conductors, such as barriers
- procedures for working on switchgear over 20 kA
- risks and control measures associated with harmful dusts and airborne contaminants - sources include thermal insulation, fibrous cement materials and asbestos and other fibre reinforced switchboard materials
- checks and storage methods for maintaining the safety of testing devices

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Evidence Guide

EVIDENCE GUIDE

9) The evidence guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

The Evidence Guide forms an integral part of this unit. It must be used in conjunction with all parts of this unit and performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accordance with industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Sources of evidence need to be 'rich' in nature to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

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Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all prerequisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated performance criteria shall be demonstrated on at least two occasions in accordance with the 'Assessment Guidelines – UEE11'. Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the performance criteria and range statement
  - Apply sustainable energy principles and practices as specified in the performance criteria and range statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in this unit. It may be required by some jurisdictions that RTOs provide a percentile graded result for the purpose of regulatory or licensing requirements.
  - Demonstrate an appropriate level of skills enabling employment
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated consistent performance across a representative range of contexts from the prescribed items below:
  - Overhaul and repair major switchgear/controlgear as described in 8) and including:

A Interpreting service and repair documentation correctly.

B Determining the state of switchgear/control gear correctly.

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C	Repairing switchgear/control gear effectively.
D	Completing documentation correctly.
E	Dealing with unplanned events by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Note:

Successful completion of relevant vendor training may be used to contribute to evidence on which competency is deemed. In these cases the alignment of outcomes of vendor training with performance criteria and critical aspects of evidence shall be clearly identified.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

OHS policy and work procedures and instructions.

Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

These should be part of the formal learning/assessment environment.

Note:

Where simulation is considered a suitable strategy for assessment, conditions must be authentic and as far as possible reproduce and replicate the workplace and be consistent with the approved industry simulation policy.

The resources used for assessment should reflect current industry practices in relation to overhauling and repairing major switchgear/controlgear.

Method of assessment

9.4)

This unit shall be assessed by methods given in Volume 1, Part 3

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'Assessment Guidelines'.

Note:

Competent performance with inherent safe working practices is expected in the industry to which this unit applies. This requires assessment in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

For optimisation of training and assessment effort, competency development in this unit may be arranged concurrently with unit:

UEENEEC001B	Maintain documentation
UEENEEC002B	Source and purchase material/parts for installation or service jobs

Range Statement

RANGE STATEMENT

10) This relates to the unit as a whole providing the range of contexts and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

This unit shall be demonstrated in relation to overhauling at least two types of low voltage switchgear/control gear rated above 20 kA and any high voltage switchgear/control gear.

Generic terms used throughout this Vocational Standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms that apply are given in Volume 2, Part 2.1.

Unit Sector(s)

Not applicable.

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Competency Field

Competency Field **11)**

Electrical

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UEENEEG157A Conduct electrical tests on LV electrical machines

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit covers electrical safety and functional testing of electrical machines designed to operate at low voltage. The unit encompasses working safely, setting up and conducting continuity, insulation and short circuit and inspection and testing of iron circuit, interpreting and documenting test results and any resulting corrective actions.

Application of the Unit

Application of the Unit **2)**

This unit is intended for competency development entry-level employment based programs incorporated in approved contracts of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit may require a license to practice in the workplace subject to regulations for undertaking of electrical work. Practice in workplace and during training is also subject to regulations directly related to occupational health and safety and where applicable contracts of training such as apprenticeships.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

UEENEEE101A	Apply Occupational Health and Safety regulations, codes and practices in the workplace
UEENEEE102A	Fabricate, assemble and dismantle utilities industry components
UEENEEE104A	Solve problems in d.c. circuits
UEENEEE105A	Fix and secure electrotechnology equipment
UEENEEE107A	Use drawings, diagrams, schedules, standards, codes and specifications
UEENEEG006A	Solve problems in single and three phase low voltage machines
UEENEEG101A	Solve problems in electromagnetic devices and related circuits
UEENEEG102A	Solve problems in low voltage a.c. circuits
UEENEEG106A	Terminate cables, cords and accessories for low voltage circuits

AND

UEENEEG150A	Wind electrical coils
UEENEEG151A	Place and connect electrical coils
UEENEEG1	Rewind three phase low voltage induction

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Prerequisite Unit(s) **4)**

53A	machines

OR

UEENEEG033A	Solve problems in single and three phase electrical apparatus and circuits
UEENEEG063A	Arrange circuits, control and protection for general electrical installations
UEENEEG108A	Trouble-shoot and repair faults in low voltage electrical apparatus and circuits

For the full prerequisite chain details for this unit please refer to Table 2 in Volume 1, Part 2

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve competency in this unit if they have reading, writing and numeracy skills indicated by the following scales. Description of each scale is given in Volume 2, Part 3 ‘Literacy and Numeracy’

Reading	4	Writing	4	Numeracy	4

Employability Skills Information

Employability Skills **5)**

This unit contains Employability Skills

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

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Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Prepare to conduct electrical tests on three phase induction machines.	1.1	OHS procedures for a given work area are identified, obtained and understood.
	1.2	Established OHS risk control measures for work preparation are followed.
	1.3	The extent of the work is determined from job sheets, specifications and regulatory requirements.
	1.4	Advice is sought from the work supervisor to ensure the work is coordinated effectively with others.
	1.5	Winding data is obtained from winding data records or directly from measurements of stator and recorded in accordance with established procedures.
	1.6	Winding is stripped from stator in accordance with established procedures.
	1.7	Materials required for the work are obtained in accordance with established procedures.
	1.8	Tools, equipment and testing devices needed to carry out the work are obtained and checked for correct operation and safety.
2 Conduct electrical tests on three phase induction machines.	2.1	Established OHS risk control work measures are followed.
	2.2	Machines/equipment are checked as being isolated where necessary in strict accordance OHS requirements and procedures.

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ELEMENT	PERFORMANCE CRITERIA	
	2.3	All necessary electrical tests are conducted to established cause of faults or operational condition of the machine.
	2.4	Status of the machine is determined from test results and recorded.
	2.5	Prescribed solutions are used to resolve work completion issues.
	2.6	Routine quality checks are conducted to ensure coils are correctly wound with correct wire, number of turns and shape.
	2.7	Work is completed in acceptable timeframe given environment and workplace conditions.
3 Complete work report.	3.1	OHS measures work completion risk controls are followed.
	3.2	The status of the machine is documented in accordance with established procedures and appropriate person(s) notified.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of safe working practices and conducting electrical tests on low voltage electrical machines.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

KS01-EG157A Low voltage motor testing devices and techniques

Evidence shall show an understanding of electric motor mechanical measuring and testing devices and techniques to an extent indicated by the following aspects:

T1 Test/measuring devices and their application

- Test/measuring devices
  - multimeter.
  - growler.

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REQUIRED SKILLS AND KNOWLEDGE

- Insulation resistance tester
- Hi-pot testing

- Application.
  - continuity.
  - insulation.
  - short circuit
  - testing of magnetic circuit.

T2 Connection of test/measuring devices into a circuit encompassing:

- safety procedures.
- circuit arrangement of test/measuring devices.

T3 Taking and interpreting readings

With regards to:

- continuity.
- insulation.
- short circuit
- testing of magnetic circuit.

T4 Storage, maintenance and care of test/measuring devices

- Storage.
- Maintenance
- Care.

Evidence Guide

EVIDENCE GUIDE

9) The evidence guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

The Evidence Guide forms an integral part of this unit. It must be used in conjunction with all parts of this unit and performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment	**9.1)**
	Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that

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can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accordance with industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Sources of evidence need to be 'rich' in nature to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all prerequisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated performance criteria shall be demonstrated on at least two occasions in accordance with the 'Assessment Guidelines – UEE11'. Evidence shall also comprise:

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- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the performance criteria and range statement
  - Apply sustainable energy principles and practices as specified in the performance criteria and range statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in this unit. It may be required by some jurisdictions that RTOs provide a percentile graded result for the purpose of regulatory or licensing requirements.
  - Demonstrate an appropriate level of skills enabling employment
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated consistent performance across a representative range of contexts from the prescribed items below:
  - Conduct electrical tests on low voltage electrical machines as described as described in 8) and including:

A Dismantling machine and storing parts securely.

B Setting up tests correctly.

C Taking test reading accurately.

D Determining the status of the machine correctly from test result.

E Documenting the status of the machine clearly.

F Dealing with unplanned events by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Note:

Successful completion of relevant vendor training may be used to contribute to evidence on which competency is deemed. In these cases the alignment of outcomes of vendor training with performance criteria and critical aspects of evidence shall be clearly identified.

Context of and specific **9.3)**

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resources for assessment

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

OHS policy and work procedures and instructions.

Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

These should be part of the formal learning/assessment environment.

Note:

Where simulation is considered a suitable strategy for assessment, conditions must be authentic and as far as possible reproduce and replicate the workplace and be consistent with the approved industry simulation policy.

The resources used for assessment should reflect current industry practices in relation to conducting electrical tests on low voltage electrical machines.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Volume 1, Part 3 ‘Assessment Guidelines’.

Note:

Competent performance with inherent safe working practices is expected in the industry to which this unit applies. This requires assessment in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

For optimisation of training and assessment effort, competency development in this unit may be arranged concurrently with unit:

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UEENEEG108A	Trouble-shoot and repair faults in low voltage electrical apparatus and circuits

OR

UEENEEG153A	Rewind three phase low voltage induction machines

The critical aspects of occupational health and safety covered in unit UEENEEE101A and other discipline specific occupational health and safety units shall be incorporated in relation to this unit.

Range Statement

RANGE STATEMENT

10) This relates to the unit as a whole providing the range of contexts and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

This unit shall be demonstrated in relation to conducting electrical tests on at least two different low voltage electrical machines with one of the machines having at least two winding faults. The purpose of the tests is to establishing:

- The causes of faults in machines, and
- Whether a machine has been correctly repaired and complies with all requirements

Generic terms used throughout this Vocational Standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms that apply are given in Volume 2, Part 2.1.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Electrical

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UEENEEG159A Conduct mechanical tests on electrical machines and components

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit covers mechanical safety and functional testing of electrical machines and their mechanical components. The unit encompasses working safely, setting up and conducting tests, taking measurements, interpreting and documenting test results and any resulting corrective actions.

Application of the Unit

Application of the Unit **2)**

This unit is intended for competency development entry-level employment based programs incorporated in approved contracts of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit may require a license to practice in the workplace subject to regulations for undertaking of electrical work. Practice in workplace and during training is also subject to regulations directly related to occupational health and safety and where applicable contracts of training such as apprenticeships.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

UEENEEG157A	Conduct electrical tests on LV electrical machines
UEENEEE101A	Apply Occupational Health and Safety regulations, codes and practices in the workplace
UEENEEE102A	Fabricate, assemble and dismantle utilities industry components
UEENEEE104A	Solve problems in d.c. circuits
UEENEEE105A	Fix and secure electrotechnology equipment
UEENEEE107A	Use drawings, diagrams, schedules, standards, codes and specifications
UEENEEG006A	Solve problems in single and three phase low voltage machines
UEENEEG101A	Solve problems in electromagnetic devices and related circuits
UEENEEG102A	Solve problems in low voltage a.c. circuits
UEENEEG106A	Terminate cables, cords and accessories for low voltage circuits

AND

UEENEEG150A	Wind electrical coils
UEENEEG151A	Place and connect electrical coils
UEENEEG1	Rewind three phase low voltage induction

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Prerequisite Unit(s) **4)**

53A	machines

OR

UEENEEG033A	Solve problems in single and three phase electrical apparatus and circuits
UEENEEG063A	Arrange circuits, control and protection for general electrical installations
UEENEEG108A	Trouble-shoot and repair faults in low voltage electrical apparatus and circuits

For the full prerequisite chain details for this unit please refer to Table 2 in Volume 1, Part 2

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve competency in this unit if they have reading, writing and numeracy skills indicated by the following scales. Description of each scale is given in Volume 2, Part 3 ‘Literacy and Numeracy’

Reading	4	Writing	4	Numeracy	4

Employability Skills Information

Employability Skills **5)**

This unit contains Employability Skills

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

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Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Prepare to conduct mechanical tests on electrical machines.	1.1	OHS procedures for a given work area are identified, obtained and understood.
	1.2	Established OHS risk control measures for work preparation are followed.
	1.3	The extent of the work is determined from job sheets, specifications and regulatory requirements.
	1.4	Advice is sought from the work supervisor to ensure the work is coordinated effectively with others.
	1.5	Machine data is obtained from data records or directly from measurements and recorded in accordance with established procedures.
	1.6	Winding is stripped from stator in accordance with established procedures.
	1.7	Materials required for the work are obtained in accordance with established procedures.
	1.8	Tools, equipment and testing devices needed to carry out the work are obtained and checked for correct operation and safety.
2 Conduct mechanical tests on three phase induction machines.	2.1	Established OHS risk control work measures are followed.
	2.2	Machines/equipment are checked as being isolated where necessary in strict accordance OHS requirements and procedures. Note:

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ELEMENT	PERFORMANCE CRITERIA	
		Particular attention shall be given to following risk control measure related to high voltage hazards
	2.3	All necessary mechanical tests/measurements are conducted to established cause of faults or operational condition of the machine.
	2.4	Status of the machine is determined from test results and recorded.
	2.5	Prescribed solutions are used to resolve work completion issues.
	2.6	Routine quality checks are conducted to ensure coils are correctly wound with correct wire, number of turns and shape.
	2.7	Work is completed in acceptable timeframe given environment and workplace conditions.
3 Complete work report.	3.1	OHS measures work completion risk controls are followed.
	3.2	The status of the machine including specifications for any repair work required is documented in accordance with established procedures and appropriate person(s) notified.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of safe working practices and conducting mechanical tests on electrical machines.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

KS01-EG159A Electric motor mechanical measuring and testing devices and techniques

Evidence shall show an understanding of electric motor mechanical measuring and

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REQUIRED SKILLS AND KNOWLEDGE

testing devices and techniques to an extent indicated by the following aspects:

T1 Devices and techniques for measuring geometric attributes encompassing:

- Measuring device for geometric attributes.
- Dynamic balancing.
- Alignment of shafts.

T2 Operational Test/measuring devices and their application encompassing:

- Operational test/measuring devices.
- Applications.

T3 Setting up test/measuring devices encompassing:

- safety procedures
- set up procedures

T4 Taking and interpreting readings encompassing:

- Correct method.
  - Taking and interpreting reading
  - Dynamic balancing
  - Aligning shafts
  - Measuring roundness

T5 Storage, maintenance and care of test/measuring devices encompassing:

- Storage of mechanical measuring and testing devices.
- maintenance of mechanical measuring and testing devices.
- Care of mechanical measuring and testing devices

Evidence Guide

EVIDENCE GUIDE

9) The evidence guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

The Evidence Guide forms an integral part of this unit. It must be used in conjunction with all parts of this unit and performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

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Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accordance with industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Sources of evidence need to be 'rich' in nature to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all prerequisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated performance criteria shall be demonstrated on at least two occasions in accordance with

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the 'Assessment Guidelines – UEE11'. Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the performance criteria and range statement
  - Apply sustainable energy principles and practices as specified in the performance criteria and range statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in this unit. It may be required by some jurisdictions that RTOs provide a percentile graded result for the purpose of regulatory or licensing requirements.
  - Demonstrate an appropriate level of skills enabling employment
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated consistent performance across a representative range of contexts from the prescribed items below:
  - Conduct mechanical tests on electrical machines as described in 8) and including:

A Dismantling machine and storing parts securely.

B Setting up tests correctly.

C Taking test/measurements reading accurately.

D Determining the status of the machine correctly from test result.

E Documenting the status of the machine clearly.

F Dealing with unplanned events by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Note:

Successful completion of relevant vendor training may be used to contribute to evidence on which competency is deemed. In these cases the alignment of outcomes of vendor training with performance criteria and critical aspects of evidence shall be clearly identified.

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Context of and specific resources for assessment **9.3)**

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

OHS policy and work procedures and instructions.

Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

These should be part of the formal learning/assessment environment.

Note:

Where simulation is considered a suitable strategy for assessment, conditions must be authentic and as far as possible reproduce and replicate the workplace and be consistent with the approved industry simulation policy.

The resources used for assessment should reflect current industry practices in relation to conducting mechanical tests on electrical machines.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Volume 1, Part 3 ‘Assessment Guidelines’.

Note:

Competent performance with inherent safe working practices is expected in the industry to which this unit applies. This requires assessment in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

For optimisation of training and assessment effort, competency

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development in this unit may be arranged concurrently with unit:

UEENEEG15 Conduct electrical tests on LV electrical machines 7A

The critical aspects of occupational health and safety covered in unit UEENEEE101A and other discipline specific occupational health and safety units shall be incorporated in relation to this unit.

Range Statement

RANGE STATEMENT

10) This relates to the unit as a whole providing the range of contexts and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

This unit shall be demonstrated in relation to conducting mechanical tests on at least two different electrical mechanical with one of the machines having at least two mechanical faults. The purpose of the tests is to establishing:

- The causes of faults in machines, and
- Whether a machine has been correctly repaired and complies with all requirements

Generic terms used throughout this Vocational Standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms that apply are given in Volume 2, Part 2.1.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Electrical

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UEENEEG164A Repair and maintain mechanical components of electrical machines

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit covers the repair and maintain of mechanical components of electrical machines including basic machining. The unit encompasses working safely and to standards, following written instructions and drawing, selecting and setting up machine tools, basic machining, measuring and documenting work activities.

Application of the Unit

Application of the Unit **2)**

This unit is intended for competency development entry-level employment based programs incorporated in approved contracts of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a license to practice in the workplace. However, practice in this unit is subject to regulations directly related to occupational health and safety and where applicable contracts of training such as apprenticeships.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

UEENEEE101A	Apply Occupational Health and Safety regulations, codes and practices in the workplace
UEENEEE102A	Fabricate, assemble and dismantle utilities industry components
UEENEEE105A	Fix and secure electrotechnology equipment
UEENEEE107A	Use drawings, diagrams, schedules, standards, codes and specifications
UEENEEG111A	Carry out basic repairs to electrical components and equipment

For the full prerequisite chain details for this unit please refer to Table 2 in Volume 1, Part 2

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve competency in this unit if they have reading, writing and numeracy skills indicated by the following scales. Description of each scale is given in Volume 2, Part 3 ‘Literacy and Numeracy’

Reading 4 Writing 4 Numeracy 4

Employability Skills Information

Employability Skills **5)**

This unit contains Employability Skills

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Employability Skills	**5)** The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare to repair component.	1.1 OHS procedures for a given work area are obtained and understood through established routines and procedures.
	1.2 Established OHS risk control measures and procedures in preparation for the work are followed.
	1.3 Safety hazards which have not previously been identified are reported and advise on risk control measures are sought from the work supervisor.
	1.4 The nature of repair work is obtained from documentation or from work supervisor to establish the scope of work to be undertaken.
	1.5 Advice is sought from the work supervisor to ensure the work is coordinated effectively with others.
	1.6 Sources of materials that may be required for the work are established in accordance with established routines and procedures.

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ELEMENT	PERFORMANCE CRITERIA	
	1.7	Tools, equipment and testing devices needed to carry out the work are obtained and checked for correct operation and safety.
	1.8	Appropriate machine is selected, checked for safety and prepared for any necessary machining operation.
	1.9	Cutting tools are selected, sharpened and set up for correctly for each particular machining operation.
2 Repair components.	2.1	Established OHS risk control measures and procedures for carrying out the work are followed.
	2.2	Circuits/machines/plant are checked as being isolated where necessary in strict accordance OHS requirements and procedures.
	2.3	Component being machined is positioned and clamped appropriately.
	2.4	Machining is carried out safely and to suit the component and material being machined.
	2.5	Appropriate measurements are taken to ensure repairs comply with technical standards and job specifications and requirements.
	2.6	Components are repaired to comply with technical standards and job specifications and requirements.
	2.7	Established methods for dealing with unexpected situations are discussed with appropriate person or persons and documented.
	2.8	Unexpected situations are dealt with safely and with the approval of an authorised person.
	2.9	Ongoing checks of the quality of repair work are undertaken in accordance with established procedures.
	2.10	Repairs are carried out efficiently without unnecessary waste of materials and energy and

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ELEMENT	PERFORMANCE CRITERIA	
		damage to apparatus, circuits, the surrounding environment or services.
3 Complete work and report.	3.1	OHS work completion risk control measures and procedures are followed.
	3.2	Work area is cleaned and made safe in accordance with established procedures.
	3.3	Fits are made to verify that repaired component conforms to requirements.
	3.4	Work completion is documented and an appropriate person or persons notified in accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of safe working practices and repairing and maintaining mechanical components of electrical machines.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

KS01-EG164A Electrical machines, mechanical components

Evidence shall show an understanding of repairing mechanical components of electrical machines to an extent indicated by the following aspects:

T1 Dangers and safety precautions

- hazardous dust
- cleaning material
- safe working practices

- T2 Electrical Machine Bearings
  - Types of bearings
  - Bearing clearances
  - Techniques for removing and fitting bearings
  - Handling and storage of bearings
  - Lubrication of bearings

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REQUIRED SKILLS AND KNOWLEDGE

- Calculation of bearing life
- Bearing damage and remedial action

- T3 Machines Couplings
  - Types of couplings, applications
  - Fitting and aligning couplings
  - Types of belts and their applications
  - Fittings and aligning pulleys
- T4 Machine
  - components of electrical machines
- T5 Machine faults and testing procedures
  - faults
  - testing
  - inspecting
- T6 Dismantling /assembling and repair procedures
  - marking of electrical connections
  - recording positions of gears/pulleys/couplings
  - dismantle procedures
  - bearing removal/replacement
  - test run
- T7 Brushes
  - characteristics
  - types
  - selection
- T8 Removal and installation
  - marking of winding connections
  - motor alignment
  - alignment procedures

Evidence Guide

EVIDENCE GUIDE

9) The evidence guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

The Evidence Guide forms an integral part of this unit. It must be used in conjunction with all parts of this unit and performed in accordance with the Assessment

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EVIDENCE GUIDE

Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accordance with industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Sources of evidence need to be 'rich' in nature to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in **9.2)**

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this unit

Before the critical aspects of evidence are considered all prerequisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated performance criteria shall be demonstrated on at least two occasions in accordance with the 'Assessment Guidelines – UEE11'. Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the performance criteria and range statement
  - Apply sustainable energy principles and practices as specified in the performance criteria and range statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in this unit. It may be required by some jurisdictions that RTOs provide a percentile graded result for the purpose of regulatory or licensing requirements.
  - Demonstrate an appropriate level of skills enabling employment
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated consistent performance across a representative range of contexts from the prescribed items below:
  - Repair mechanical components of electrical machines as described as described in 8) and including:

A Establishing the nature of the repair work.

B Selecting appropriate method of repair.

C Sharpening cutting tools/twist drills correctly.

D Securing work piece correctly.

E Repairing component to required standard.

F Documenting repairs in accordance with established procedures.

G Dealing with unplanned events by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

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Note:

Successful completion of relevant vendor training may be used to contribute to evidence on which competency is deemed. In these cases the alignment of outcomes of vendor training with performance criteria and critical aspects of evidence shall be clearly identified

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

OHS policy and work procedures and instructions.

Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

These should be part of the formal learning/assessment environment.

Note:

Where simulation is considered a suitable strategy for assessment, conditions must be authentic and as far as possible reproduce and replicate the workplace and be consistent with the approved industry simulation policy.

The resources used for assessment should reflect current industry practices in relation to repairing mechanical components of electrical machines.

Method of assessment

9.4)

This unit shall be assessed by methods given in Volume 1, Part 3 ‘Assessment Guidelines’.

Note:

Competent performance with inherent safe working practices is expected in the industry to which this unit applies. This requires assessment in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

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Concurrent assessment and relationship with other units **9.5)**

There are no concurrent assessment recommendations for this unit.

The critical aspects of occupational health and safety covered in unit UEENEEE101A and other discipline specific occupational health and safety units shall be incorporated in relation to this unit.

Range Statement

RANGE STATEMENT

10) This relates to the unit as a whole providing the range of contexts and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

This unit shall be demonstrated in relation to repairs and maintenance of at least two of the following electrical machine components:

- Shaft
- Bearing housing
- End shield
- Fan
- Coupling
- Machine housing

Generic terms used throughout this Vocational Standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms that apply are given in Volume 2, Part 2.1.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

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Competency Field **11)**

Electrical

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UEENEEG165A Maintain and service traction lifts systems and equipment

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit covers maintenance and servicing of traction lift systems and equipment. It encompasses working safely, conducting site cleaning, lubricating and painting lift equipment, inspecting of suspension, governors, compensators, floor selector and tappet switch ropes, and carrying out periodic testing on lift safety gear.

Application of the Unit

Application of the Unit **2)**

This unit applies to any formal recognition for this standard at the aligned AQF 3 level or higher.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit require a license to practice in the workplace where plant and equipment operate at voltage above 50 V a.c. or 120 V d.c. However other conditions may apply in some jurisdictions subject to regulations related to electrical work. Practice in the workplace and during training is also subject to regulations directly related to occupational health and safety and where applicable contracts of training such as apprenticeships.

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Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

UEENEEE101A	Apply Occupational Health and Safety regulations, codes and practices in the workplace
UEENEEE102A	Fabricate, dismantle, assemble of utilities components
UEENEEE104A	Solve problems in d.c circuits
UEENEEE105A	Fix and secure electrotechnology equipment
UEENEEE107A	Use drawings, diagrams, schedules, standards, codes and specifications
UEENEEG006A	Solve problems in single and three phase low voltage machines
UEENEEG033A	Solve problems in single and three phase electrical apparatus and circuits
UEENEEG063A	Arrange circuits, control and protection for general electrical installations
UEENEEG101A	Solve problems in electromagnetic devices and related circuits
UEENEEG102A	Solve problems in low voltage a.c. circuit
UEENEEG106A	Terminate cables, cords and accessories for low voltage circuits
UEENEEG108A	Trouble-shoot and repair faults in low voltage electrical apparatus and circuits

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Prerequisite Unit(s) **4)**

UEENEEG116A	Diagnose and rectify faults in traction lift systems

For the full prerequisite chain details for this unit please refer to Table 2 in Volume 1, Part 2

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve competency in this unit if they have reading, writing and numeracy skills indicated by the following scales. Description of each scale is given in Volume 2, Part 3 'Literacy and Numeracy'

Reading	4	Writing	4	Numeracy	4

Employability Skills Information

Employability Skills **5)**

This unit contains Employability Skills

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare to maintain and service lift equipment.	1.1 OHS procedures for a given work area are identified, obtained and understood.
	1.2 OHS risk control measures and procedures in preparation for the work are followed.
	1.3 The likely extend of work to be undertaken is envisaged from maintain procedures or fault/breakdown reports and/or discussions with appropriate person(s).
	1.4 Advice is sought from the work supervisor to ensure the work is coordinated effectively with others.
	1.5 Tools, equipment and testing devices needed to carry out the work are obtained in accordance with established procedures and checked for correct operation and safety.
2 Maintain and service lift equipment.	2.1 OHS risk control measures and procedures for carrying out the work are followed.
	2.2 The need to test or measure live is determined in strict accordance with OHS requirements and when necessary conducted within established safety procedures.
	2.3 Circuits/machines/plant are checked as being isolated where necessary in strict accordance OHS requirements and procedures.
	2.4 Safety hazards resulting from the fault or breakdown are documented and risk control measured and devised and implemented in consultation with appropriate personnel.
3 Completion and report of maintain and servicing activities	3.1 OHS work completion risk control measures and procedures are followed.
	3.2 Reusable, faulty or worn components are tagged and dispatched for repair to maintain adequate spares.

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ELEMENT	PERFORMANCE CRITERIA
	3.3 Maintenance work activities are documented in accordance with established procedures. Note. Examples of documentation are components fault reports, test results, authorisations, permits, parts/component dispatch and store records

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of safe working practices and maintaining and servicing traction lifts.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

KS01-EG165A Lift systems - lift component

Evidence shall show an understanding of the maintenance and servicing of traction lifts to an extent indicated by the following aspects:

T1 Lubricant selection for lift components encompassing:

- Corrosion protection
- Friction reduction
- Cooling
- Viscosity
- Lubricant loss and loss estimation
- Suitable oils, greases, coolants, rust preventatives and solvents for particular devices

T2 Lubricant application for lift components encompassing:

- Hand, Grease guns,
- Oil cans,
- Pressure lubricators,
- Oil misters,
- Level indicators,
- Estimating quantities,
- Lubrication points
- Automatic lubricators

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REQUIRED SKILLS AND KNOWLEDGE

T3 Lift systems single and multiple wrap roping, types of ropes and their attachments encompassing:

- Hoisting
- Governor
- Tappet
- Compensator
- Selector
- Normal lay rope
- Langs lay rope
- Standard ends attachments
- Splices
- Wedge sockets
- Talurit fitting
- Babbit sockets
- Secon fitting

T4 Lift systems basic rope inspection encompassing: Lift systems basic rope inspection encompassing:

- Requirements of Lift Code/enterprise
- Purpose
- Wear
- Broken strands
- Diameter
- Deformation
- Corrosion
- Lubrication
- Tension

T5 Rope stretch encompassing:

- Requirements of Lift Code/enterprise
- Counterweight clearance
- Compensatory equipment

T6 Inspection of rope attachments encompassing:

- Requirements of Lift Code/enterprise
- Rope anchor rods
- Castings, Springs
- Wedges
- Swaging
- Checking for fracturing
- Deformation
- Remedial action

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REQUIRED SKILLS AND KNOWLEDGE

T7 Inspection of sheaves encompassing:

- Groove condition
- Rifling
- Ropes down in sheaves
- Maintenance records

T8 Maintenance, replacement and adjustment of mechanical lift components encompassing:

- Door locks
- Air cords
- Selectors
- Bearings; roller, sleeve, guide shoes, and slipper
- Door guides
- Landing doors
- Car doors
- Tapes/chains
- Motor room equipment
- Well equipment
- Pit equipment

Evidence Guide

EVIDENCE GUIDE

9) The evidence guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

The Evidence Guide forms an integral part of this unit. It must be used in conjunction with all parts of this unit and performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment	**9.1)**
	Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment

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is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accordance with industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Sources of evidence need to be 'rich' in nature to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all prerequisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated performance criteria shall be demonstrated on at least two occasions in accordance with the 'Assessment Guidelines – UEE11'. Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:

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- Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the performance criteria and range statement
- Apply sustainable energy principles and practices as specified in the performance criteria and range statement
- Demonstrate an understanding of the essential knowledge and associated skills as described in this unit. It may be required by some jurisdictions that RTOs provide a percentile graded result for the purpose of regulatory or licensing requirements.
- Demonstrate an appropriate level of skills enabling employment
- Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures

- Demonstrated consistent performance across a representative range of contexts from the prescribed items below:
  - Maintain and service traction lifts as described as described in 8) and including:

A Conduct site cleaning, lubricating and painting of lift equipment.

B Inspect lift ropes.

C Maintain electro-hydraulic lift equipment.

D Carry out lift safety gear periodic testing.

E Dealing with unplanned events by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Note:

Successful completion of relevant vendor training may be used to contribute to evidence on which competency is deemed. In these cases the alignment of outcomes of vendor training with performance criteria and critical aspects of evidence shall be clearly identified

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

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OHS policy and work procedures and instructions.

Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

These should be part of the formal learning/assessment environment.

Note:

Where simulation is considered a suitable strategy for assessment, conditions must be authentic and as far as possible reproduce and replicate the workplace and be consistent with the approved industry simulation policy.

The resources used for assessment should reflect current industry practices in relation to maintaining and servicing traction lifts.

Method of assessment

9.4)

This unit shall be assessed by methods given in Volume 1, Part 3 'Assessment Guidelines'.

Note:

Competent performance with inherent safe working practices is expected in the industry to which this unit applies. This requires assessment in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no concurrent assessment recommendations for this unit.

Range Statement

RANGE STATEMENT

10) This relates to the unit as a whole providing the range of contexts and conditions to which the performance criteria apply. It allows for different work environments and

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RANGE STATEMENT

situations that will affect performance.

- Competency shall be demonstrated in relation to maintaining and servicing at least two of the lift equipment as following:
  - Geared traction drive
  - Gearless traction drive
  - Drum drive
  - Suspended electro-hydraulic drive
- At least two of the roping systems as following:
  - Single or double wrap
  - Single or multiple fall
  - Side slung or underslung
  - Overhead or basement drive
  - Drum drive.
- And at least two of the components as following:
  - Suspension ropes
  - Governor ropes
  - Tappet ropes
  - Compensator ropes
  - Floor selector tapes/ropes
- All safety gear periodic tests as following:
  - Governor type A
  - Governor type B
  - Governor type C

Generic terms used throughout this Vocational Standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms that apply are given in Volume 2, Part 2.1.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Electrical

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UEENEEG199A Conduct compliance and functional verification of electrical apparatus and existing circuits

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit covers inspection and testing to verify whether an electrical apparatus and/or existing circuits are safe and complies with all requirements. It encompasses working safely, visual inspections and mandatory, optional and functional testing following verification procedures, identifying non-compliance defects and mandatory reporting requirements.

Application of the Unit

Application of the Unit **2)**

2.1) General Application

This unit applies to all qualifications, competencies and/or Skill Sets which require an unrestricted electrical fitter licence.

Licensing/Regulatory Information

License to practice **3)**

During Training: Competency development activities are subject to regulations directly related to licencing, occupational health and safety and where applicable contracts of training such as apprenticeships.

In the workplace: The application of the skills and knowledge described in this unit require a license to

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License to practice **3)**

practice in the workplace where work is carried out on electrical equipment or existing circuits which are designed to operate at voltages greater than 50 V a.c. or 120 V d.c.

Other conditions may apply under State and Territory legislative and regulatory requirements.

Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

UEENEEE101A	Apply Occupational Health and Safety regulations, codes and practices in the workplace
UEENEEE102A	Fabricate, dismantle and assemble and utilities components
UEENEEE104A	Solve problems in d.c circuits
UEENEEE105A	Fix and secure electrotechnology equipment
UEENEEE107B	Use drawings, diagrams, schedules, standards, codes and specifications
UEENEEE137A	Document and apply measures to control OHS risks associated with electrotechnology work
UEENEEG006A	Solve problems in single and three phase low voltage machines
UEENEEG033A	Solve problems in single and three phase electrical apparatus and circuits
UEENEEG0	Arrange circuits, control and protection for

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Prerequisite Unit(s) **4)**

63A	general electrical installations
UEENEEG101A	Solve problems in electromagnetic devices and related circuits
UEENEEG102A	Solve problems in low voltage a.c. circuits
UEENEEG106A	Terminate cables, cords and accessories for low voltage circuits
UEENEEG108A	Trouble-shoot and repair faults in electrical apparatus and circuits
UEENEEG109A	Develop and connect electrical control circuits

Further Information:

For the full prerequisite chain details for this unit please refer to Table 2 in Volume 1, Part 2

Current Licence Holders:

Those holding an ‘Electrical Fitter Licence’ or equivalent issued in an Australian State or Territory meet the requirements of this unit and its pre-requisite requirements.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve competency in this unit if they have reading, writing and numeracy skills indicated by the following scales. Description of each scale is given in Volume 2, Part 3 ‘Literacy and Numeracy’

Reading 5 Writing 5 Numeracy 5

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of

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Employability Skills	**5)** competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare to inspect and test electrical apparatus and existing circuits.	1.1 OHS measures for the site are identified, obtained and understood.
	1.2 Established OHS risk control measures and procedures in preparation for the work are followed
	1.3 Safety hazards, which have not previously been identified, are noted and established risk control measures are implemented.
	1.4 Documentation or deemed to comply standard on which electrical apparatus and existing circuits is based is reviewed and understood.
	1.5 Appropriate personnel are consulted to ensure the work is coordinated effectively with others involved on the work site.
	1.6 Tools, equipment and testing devices needed to verify compliance are obtained in accordance with established procedures and

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ELEMENT	PERFORMANCE CRITERIA	
		checked for correct operation and safety.
	1.7	Preparatory work is checked to ensure no damage has occurred and complies with requirements.
2 Visually inspect and conduct safety testing on electrical apparatus and existing circuits.	2.1	OHS risk control measures and procedures for carrying out the work are followed.
	2.2	The need to test or measure live is determined in strict accordance with OHS requirements and when necessary conducted within established safety procedures.
	2.3	Circuits/machines/plant are checked as being isolated where necessary in strict accordance OHS requirements and following switch-off, lock out and tagging procedures.
	2.4	Knowledge of electrical principles and their application to electrical apparatus and existing circuits is drawn upon in determining whether an electrical apparatus/existing circuits is compliant and functions safely and as intended.
	2.5	Wiring is checked for suitability for the environments in which they are installed and suitably protected from damage or overheating.
	2.6	Protection methods and devices are validated as meeting co-ordination requirements for overload and short-circuit protection.
	2.7	Switchgear and control gear is validated as being appropriately rated and meeting functional requirements.
	2.8	Evidence that electrical equipment complies with safety requirements is cited.
	2.9	Earthing system components are checked that they are correctly located and conductors correctly sized.
	2.12	Mandatory tests are conducted on all connected electrical apparatus and existing

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ELEMENT	PERFORMANCE CRITERIA	
		circuits to verify that: earthing conductor resistance is sufficiently low; insulation resistance is sufficiently high; all polarities are correct; and circuit connections are correct.
	2.12	Testing is conducted to verify that: fault-loop impedance is sufficiently low and residual current devices operates as intended.
3 Report inspection and test findings.	3.1	OHS risk control work completion measures and procedures are followed.
	3.2	Work site is cleaned and made safe in accordance with established procedures.
	3.3	Non-compliance defects are identified and reported in accordance with established procedures.
	3.4	Recommendations for rectifying defects are made in accordance with established procedures.
	3.5	Mandatory documentation is completed in accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of safe working practices and verifying compliance and functionality of electrical apparatus and existing circuits.

The knowledge and skills shall be contextualised to current industry standards, technologies and practices.

KS01-EG199A Electrical apparatus and existing circuits — verification and testing

Evidence shall show an understanding of electrical apparatus and existing circuits testing and verification to an extent indicated by the following aspects:

T1 (Is the number correct?)Electrical safety encompassing:

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REQUIRED SKILLS AND KNOWLEDGE

- Safety procedures for working on electrical systems, circuits and apparatus.
- Safe working practices as a normal part of carrying out electrical installation work
- Isolation and lockout procedures
- Tools and equipment needed to conduct electrical work compliance inspection and testing.

T2 Legislated regulations encompassing:

- legislation and regulations that require electrical apparatus and existing circuits to be inspected and tested to ensure they are safe.
- the person/bodies responsible for the various aspects of ensuring electrical apparatus and existing circuits are safe.
- results of tests that show an electrical apparatus and existing circuits is safe for connection to the supply.
- results of periodic inspection and tests that show electrical equipment are safe to use.

T3 Visual inspection of electrical apparatus and existing circuits for compliance with the Wiring Rules encompassing:

- Protection requirements
- General condition
- Wiring systems
- Equipment and accessories
- Earthing

T4 Testing electrical apparatus and existing circuits encompassing:

- tests to ensure: insulation resistance is adequate; earth continuity is such that it will ensure the operation of protection devices under earth fault conditions; polarity of active/s and neutral for final subcircuits is correct; there is no transposition of earthing and neutral conductors; fault-loop impedance is sufficiently low; RCD for correct operation and sensitivity.
- functional tests to ensure active/s and neutral for the same circuit are clearly identified with their circuit protection device.
- tests that show all circuits and devices operate as intended.
- tests to determine the fault level at a particular point in an installation.

T5 Documentation encompassing:

- results of tests conducted on an electrical apparatus and existing circuits comply with requirements and ensure the installation is safe.
- documents of the results of testing electrical apparatus and existing circuits as required by the local supply authority.
- documents of periodic testing and inspection of electrical equipment including tagging requirements.

KS02–EG199A Electrical apparatus and existing circuits — principles and requirements

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REQUIRED SKILLS AND KNOWLEDGE

Evidence shall show an understanding of electrical apparatus and existing circuits principles and requirements to an extent indicated by the following aspects:

T1 (Is the number correct?)Effects of electric current encompassing:

- Physiological effects of current.
- Basic principles by which an electric current can produce heat, light, motion and a chemical reaction.

T2 Single path practical circuit encompassing:

- Arrangement of energy source, protection device, switch and load in a circuit.
- The purpose of each component in the circuit.
- Consequences of an open-circuits, closed-circuits and short-circuits.

T3 Single-source multiple-path d.c. circuits encompassing:

- Circuit configurations and connection.
- Relationship between parameter of voltage, current, resistance power dissipation in the whole or any part of the circuit.
- Safely measuring the parameters for the whole or any part of the circuit.
- Methods of determining circuit behaviour for variation in any of the parameters from measured and calculated values.

T4 Alternating voltage and current generation, phase relationships, energy in an a.c. circuit encompassing:

- Sinusoidal voltage generation and resulting current.
- The terms period; maximum value; peak-to-peak value; instantaneous value; average value; root-mean-square (r.m.s.) value; and frequency.
- Three-phases generation.
- Relationship between the phase voltages generated in a three-phase alternator and the conventions for identifying each.
- Method of determining the phase sequence or phase rotation of a three-phase supply.
- Methods of determining power and energy supplied by three phase circuits.

T5 Fundamental safety principles of the AS/NZS 3000 Part 1 (Section 1) and deemed to comply solution given in Part 2 encompassing:

- Definition of terms
- Fundamental safety principles of protection against direct and indirect contact with live parts; thermal effects; overcurrent; earth faults; abnormal voltages; spread of fire; mechanical injury and external influences.
- Fundamental principles of installation design; selection and installation of equipment; means of compliance (including alterations, additions and repairs) and verification of compliance.

T6 Electric motor selection, starting method and overload protection encompassing:

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REQUIRED SKILLS AND KNOWLEDGE

- Types of motor enclosures suitable for given environmental conditions
- Criteria for selecting motor starters and overload protection.
- Types and connection arrangements for direct-on-line and reduced voltage starters.
- Thermal, magnetic and thermistor overload protection methods.

T7 Ability to apply AS/NZ 3000 requirements for protective and functional earthing encompassing:

- Purpose of protective and functional earthing.
- Parts of the protective earthing systems.
- Earthing arrangements, earthing of equipment and equipotential bonding.
- Methods of determining the maximum fault loop impedance for a circuit.
- Selection of protective conductor and active conductor sizes for each circuit to ensure earth-fault loop impedance is sufficiently low to operate the circuit protective device.

T8 MEN system and its application encompassing:

- The roles of the protective earthing (PE) and neutral (N) conductors in an a consumer's installation and their relationship to the protective earth neutral (PEN) conductor in the electricity distributor's system or sub-main to an outbuilding.
- The importance of the MEN link when a fault occurs.
- The likely consequences of the absence of the MEN link or high impendence in the PEN conductor when a fault occurs.
- The requirements for installation of an MEN link in an installation and an outbuilding.

T9 Knowledge of the application of transformers encompassing:

- Transformers used in distribution and transmission systems and large consumer installations.
- Transformers used in welding machines.
- Applications in appliances
- Risks and safety control measures associated with connection and disconnection of instrument transformers
- Safe working procedures when connecting and testing transformers.
- AS/NZS 3000 requirements and restriction on the installation and use of transformers.

T10 Ability to apply AS/NZ 3000 requirements for protection of circuit against overcurrent and abnormal voltages encompassing:

- Minimum fault levels specified by electricity distributors
- Methods and arrangement for protection against short-circuit currents and overload currents.
- Coordination of overload and short-circuit protection devices.
- Coordination between conductors and overload protection device.
- Causes of over and undervoltage.

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REQUIRED SKILLS AND KNOWLEDGE

- Device and requirements for protection against over and undervoltage.

T11 Additional protection by use of RCDs and use of extra-low voltage for basic and fault protection encompassing:

- Limitation of an RCD to protect against contact with live parts
- AS/NZS 3000 requirements for use of RCDs.
- Conditions for use of extra-low voltage to provide for basic and fault protection
- AS/NZS 3000 requirements for installation of SELV and PELV systems

T12 Ability to apply AS/NZS 3000 requirements for control and protection of electrical apparatus and existing circuits encompassing:

- Devices for functions of isolation; emergency; Mechanical maintenance and functional control.
- Method for assessing prospective short circuit current.
- Devices and arrangement for protection against overload and short-circuit current.
- Additional protection by RCD
- Protection against switchboard internal arc faults.

T13 Knowledge of AS/NZS 3000 requirements for electrical apparatus and existing circuits in hazardous areas encompassing:

- Types of areas classified as a hazardous area
- Standards to which the maintenance of electrical equipment shall comply.
- Addition training required to work competently with electrical equipment for hazardous areas

T14 Ability to verify compliance of electrical apparatus and existing circuits in accordance with AS/NZS 3000 encompassing:

- Visual inspection to determine whether the electrical apparatus and existing circuits complies with requirements set out in Section 2 to 7 of AS/NZS 3000 and relevant specific installation standards.
- Mandatory tests following guidance given in AS/NZS 3017
- Portable tool safety testing and tagging system in accordance with AS/NZS 3760.

T15 Ability to perform effective safe isolation of any equipment encompassing:

- Preparation of a ‘safe work method statement’ (SWMS) or Job Safety Analysis (JSA) for effective safe isolation.
- Safe methods for identifying source of supply to be isolated.
- Switching-off, lock-out and tagging procedures.
- Safe methods for confirming effective and safe isolation

T16 Ability to apply AS/NZS 3000 requirements to carryout repairs and terminating thermoplastic insulated cables; elastomer sheathed cables; XLPE sheathed cables; and high temperature cables; armoured cables; and neutral screened cables in a wide range of applications.

T17 Ability to perform the circuit tests required for electrical cables in a range of

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REQUIRED SKILLS AND KNOWLEDGE

installations and final sub-circuit encompassing:

- Following safe testing procedures.
- Tests to show if the earth continuity and earth-fault loop impedance are sufficiently low.
- Testing to show if insulation resistance is sufficiently high.
- Testing to show if the polarity and circuit connections are correct.

T18 Ability to read, sketch and interpret electrical diagrams encompassing:

- Purpose and characteristics of schematic, block and wiring diagrams, plans and schedules.
- Conventions used in documenting electrical information
- Read and interpret schematic, block and wiring diagrams, plans and schedules
- Sketch electrical diagrams using conventional symbols

T19 Knowledge and understanding occupational safety and health encompassing:

- Basics of Occupational Safety and Health regulations
- Legal responsibilities for employers and employees
- Employers' and employees' own "duty of care".
- Safety committees and their role

T20 Knowledge and understanding of the requirements for personal safety in the workplace encompassing:

- Purpose and use of Safe Work Method Statements (SWMS) or Job Safety Analysis (JSA).
- Purpose and process of reporting OHS incidents.
- Safety procedures for working with electrical circuits and equipment.
- Procedures for safe and effective isolation of electrical supply.
- Regulations for the supervision of apprentices and trainees.

T21 Process in rescuing a person in contact with live electrical conductors or equipment and the primary importance of the safety of the rescuer.

T22 Application of emergency first aid requirements for an electric shock victim encompassing:

- Calling for help.
- Applying cardiopulmonary resuscitation (CPR).
- Selection and use of fire extinguishers to control electrical fire at accident site.

T23 Dangers of high voltage equipment and distribution systems encompassing:

- Step and touch and induced voltages.
- Sources of induced voltage and stored energy
- Creepage and clearance requirements.
- Application of safe working procedures in the vicinity of HV equipment.

T24 Systematic method of commissioning and decommissioning electrical

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REQUIRED SKILLS AND KNOWLEDGE

equipment and existing circuits encompassing:

- Commissioning safety procedures
- Circuit voltage testing
- Phase rotation checks
- Functional testing
- Instrument and control parameter settings
- Decommissioning safety procedures.
- Identification of circuits with their control and protection devices.
- Impact of isolation on other parts of an installation.
- Tagging, testing and earthing.
- Safe removal of equipment.

T25 Diagnosing and rectifying faults in electrical apparatus and existing circuits encompassing:

- Faults such as open-circuit; short-circuit; incorrect connections; insulation failure; unsafe condition; apparatus/component failure; related mechanical failure;
- Apparatus such as control devices; fixed appliances/accessories; lighting; electrical machines motors and controls; socket outlets, transformers; protection and metering devices.
- Circuits such as those supplying fixed appliances; lighting; socket outlets; motors and controls circuits; transformers; electronic or computer based equipment.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the unit. It must be read in conjunction with the performance criteria and the range statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this unit. It must be used in conjunction with all parts of this unit and performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment	**9.1)**
	Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment

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intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accordance with industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Sources of evidence need to be 'rich' in nature to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all prerequisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated performance criteria shall be demonstrated on at least two occasions in accordance with the 'Assessment Guidelines – UEE11'. Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline,

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work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:

- Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the performance criteria and range statement
- Apply sustainable energy principles and practices as specified in the performance criteria and range statement
- Demonstrate an understanding of the essential knowledge and associated skills as described in this unit. It may be required by some jurisdictions that RTOs provide a percentile graded result for the purpose of regulatory or licensing requirements.
- Demonstrate an appropriate level of skills enabling employment
- Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures

- Demonstrated consistent performance across a representative range of contexts from the prescribed items below:
  - Verify compliance and functionality of general electrical apparatus and existing circuit installations as described as described in 8) and including:

A Selecting correct tools and testing equipment.

B Identifying visual non-compliance defects.

C Using effective methods for conducting mandatory and optional tests.

D Identifying non-compliance and functional defects from test results.

E Identifying causes of non-compliance and functional defects.

F Completing mandatory reporting.

G Dealing with unplanned events

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

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OHS policy and work procedures and instructions.

Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

These should be part of the formal learning/assessment environment.

Note:

Where simulation is considered a suitable strategy for assessment, conditions must be authentic and as far as possible reproduce and replicate the workplace and be consistent with the approved industry simulation policy.

The resources used for assessment should reflect current industry practices in relation to verifying compliance and functionality of electrical apparatus and existing circuits.

Method of assessment

9.4)

This unit shall be assessed by methods given in Volume 1, Part 3 'Assessment Guidelines'.

Note:

Competent performance with inherent safe working practices is expected in the industry to which this unit applies. This requires assessment in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no concurrent assessment recommendations for this unit.

Range Statement

RANGE STATEMENT

10) This relates to the unit as a whole providing the range of contexts and conditions

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RANGE STATEMENT

to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

This unit shall be demonstrated in relation to verification and testing for at least two types of installations containing electrical apparatus and existing circuits comprising an apparatus and existing circuit supplied by a single phase supply. The other installations shall include apparatus and existing circuits supplied by a three phase supply.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Electrical

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UEENEEH102A Repairs basic electronic apparatus faults by replacement of components

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit deals the replacement of electronic components, cabling and sub systems of electronic apparatus. It encompasses safe working practices, following written and oral instruction and procedures, basic testing and techniques, dismantling and assembling apparatus and disconnecting and reconnecting components.

Application of the Unit

Application of the Unit **2)**

This unit may apply to persons entering work in electro technology and may be used in school based vocational programs.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a license to practice in the workplace provided equipment is not connected to installation wiring at voltage above 50 V a.c. or 120 V d.c. However, practice in this unit is subject to regulations directly related to occupational health and safety and where applicable contracts of training such as apprenticeships.

Note:

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License to practice **3)**

1. Compliance with permits may be required in various jurisdictions and typically relates to the operation of plant, machinery and equipment such as elevating work platforms, powder operated fixing tools, power operated tools, vehicles, road signage and traffic control, lifting equipment and the like. Permits may also be required for some work environments such as confined spaces, working aloft, near live electrical apparatus and site rehabilitation.

2. Compliance may be required in various jurisdictions relating to currency in First Aid, confined space, lifting and risk safety measures

Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

UEENEEE101A	Apply Occupational Health and Safety regulations, codes and practices in the workplace
UEENEEE102A	Fabricate, dismantle, assemble of utilities industry components

For the full prerequisite chain details for this unit please refer to Table 2 in Volume 1, Part 2

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve competency in this unit if they have reading, writing and numeracy skills indicated by the following scales. Description of each scale is given in Volume 2, Part 3 ‘Literacy and Numeracy’

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Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

This unit contains Employability Skills

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare to repair electronic apparatus.	1.1 OHS procedures for a given work area are identified, obtained and understood through established routines and procedures.
	1.2 Established OHS risk control measures and procedures are followed in preparation for the work.
	1.3 The nature of the repair is obtained from documentation or from work supervisor to establish the scope of work to be undertaken.
	1.4 Advice is sought from the work supervisor to ensure the work is co-ordinated effectively with others.

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ELEMENT	PERFORMANCE CRITERIA	
	1.5	Sources of materials that may be required for the work are established in accordance with established routines and procedures.
	1.6	Tools, apparatus and testing devices needed to carry out the work are obtained and checked for correct operation and safety.
2 Repair electronic apparatus.	2.1	Established OHS risk control measures and procedures for carrying out the work are followed.
	2.2	The need to test or measure live is determined in strict accordance with OHS requirements and when necessary conducted within established safety procedures.
	2.3	Circuits/apparatus are checked as being isolated where necessary in strict accordance OHS requirements and procedures.
	2.4	Apparatus is dismantled in accordance with manufacturer's guide and supervisor's instructions.
	2.5	Component parts are tagged during the dismantling to help ensure correct and efficient reassembly and stored to protect them against loss or damage.
	2.6	Repairs are affected efficiently without damage to other components, apparatus or circuits.
	2.7	Apparatus is assembled in an appropriate sequence with all components parts placed, secured and connected in accordance with manufacturer's guide or industry practice.
	2.8	Procedures for referring non-routine events to immediate supervisor for directions are followed.
	2.9	Repairs are carried out efficiently without waste of materials or damage to apparatus and the surrounding environment or services and using sustainable energy practices.

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ELEMENT	PERFORMANCE CRITERIA	
3 Complete and report repair work activities.	3.1	OHS work completion risk control measures and procedures are followed.
	3.2	Repaired apparatus is prepared and forwarded to appropriate person(s) for testing.
	3.3	Work area is cleaned and made safe in accordance with established procedures.
	3.4	Work supervisor is notified of the completion of the repair work in accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of safe working practices and carrying out basic repairs to electronic apparatus by replacement of components.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

KS01-EH102A Component replacement to repair basic electronic apparatus faults

Evidence shall show an understanding of component replacement to repair basic electronic apparatus faults, applying safe working practices and relevant Standards, Codes and Regulations to an extent indicated by the following aspects:

T1. Electronic soldering equipment and techniques

- Workshop hazards and safety associated with soldering
- Quality concepts
- Electronic soldering equipment
- The soldering process
- Lead free solder

T2. Printed circuit board soldering techniques

- Electronic component mounting
- Solder rework of printed circuit boards.
- Faulty solder joints

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REQUIRED SKILLS AND KNOWLEDGE

T3. Soldering electronic cables

- Soldering multi-strand, ribbon and coaxial cables
- Effects and prevention of electrostatic discharge (ESD)

T4. Electronic component basics

- Types of components
- The physical features and primary characteristic of components
- Marking and codes on components
- Handling static sensitive components

T5. Electronic cable overview and coaxial cable

- Coaxial cables types and characteristics
- Coaxial cable termination

T6. Performance copper cables

- Twisted pair voice and data cables
- Insulation displacement (IDC) termination
- Colour codes
- Terminating performance cables
- Harness wiring

T7. Electronic apparatus components

- Fault finding
- Testing
- Replacement

Evidence Guide

EVIDENCE GUIDE

9) The evidence guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this Training Package. .

The Evidence Guide forms an integral part of this unit. It must be used in conjunction with all parts of the unit and performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment	**9.1)**

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Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry-preferred model for apprenticeships. However, where summative (or final) assessment is used it must include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Sources of evidence need to be 'rich' in nature to minimise error in judgment.

Activities associated with normal everyday work influence decisions about how/how much the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all prerequisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each Element and associated performance criteria shall be demonstrated on at least two occasions in accordance with

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the 'Assessment Guidelines – UEE11'. Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices, including the use of risk control measures as specified in the performance criteria and range statement
  - Apply sustainable energy principles and practices as specified in the performance criteria and range statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in this unit. It may be required by some jurisdictions that RTOs provide a percentile graded result for the purpose of regulatory or licensing requirements.
  - Demonstrate an appropriate level of skills enabling employment
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated consistent performance across a representative range of contexts from the prescribed items below:
  - Carry out basic repairs to electronic apparatus by replacement of components as described in 8) and including:

A Following manufacturer service instructions for access to components.

B Removing at least three different types of components specified in the work instructions.

C Replacing components to manufacturer requirements.

D Terminating correctly electronic cables using solderless termination techniques

E De-soldering and soldering to a high reliability standard and without damage to components.

F Reassembling the apparatus correctly.

G Testing apparatus operation.

H Dealing with unplanned events by drawing on essential knowledge and skills to provide appropriate solutions incorporated in a holistic assessment with the above listed items.

Note:

Successful completion of relevant vendor training may be used to

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contribute to evidence on which competency is deemed. In these cases the alignment of outcomes of vendor training with performance criteria and critical aspects of evidence shall be clearly identified.

Context of and specific resources for assessment **9.3)**

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

These should be part of the formal learning/assessment environment.

Note: Where simulation is considered a suitable strategy for assessment, conditions must be authentic and as far as possible reproduce and replicate the workplace and be consistent with the approved industry simulation policy.

The resources used for assessment should reflect current industry practices in relation to carrying out basic repairs to electronic apparatus by replacement of components.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Volume 1, Part 3 ‘Assessment Guidelines’.

Note: Competent performance with inherent safe working practices is expected in the industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and **9.5)**

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relationship with other units

For optimisation of training and assessment effort, competency development in this unit may be arranged concurrently with unit:

UEENEEE102A	Fabricate, dismantle, assemble of utilities industry components

Range Statement

RANGE STATEMENT

10) This relates to the unit as a whole providing the range of contexts and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

This unit shall be demonstrated in relation to carrying out basic repairs electronic apparatus limited to replacement or repair of components, including sub systems in which the fault has been previously established.

At least two of the repairs shall require soldering and desoldering and at least two of the repairs shall require a cable to be correctly terminated using a solderless termination technique.

Generic terms used throughout this Vocational Standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms that apply are given in Volume 2, Part 2.1.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Electronics

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UEENEEH111A Troubleshoot single phase input d.c. power supplies

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit covers determining correct operation of independent power supplies and power supply sections of electronic apparatus. It encompasses working safely, problem solving procedures, including the use of voltage, current and resistance measuring devices, providing solutions derived from measurements and calculations to predictable problems in d.c. power supplies with single phases input.

Application of the Unit

Application of the Unit **2)**

This competency standard unit is intended for development of competency in either entry-level employment based programs incorporated in approved contracts of training or other approved training programs. It may also be used to augment formally acquired competencies.

This unit is intended to apply to any recognised development program that leads to the acquisition of a formal award at AQF level 3 or higher.

Licensing/Regulatory Information

License to practice **3)**

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License to practice **3)**

The skills and knowledge described in this unit do not require a license to practice in the workplace provided equipment is not connected to installation wiring at voltage above 50 V a.c. or 120 V d.c. However other conditions may apply in some States/Territories subject to regulations related to electrical work.

Practice in the workplace and during training is also subject to regulations directly related to occupational health and safety and where applicable contracts of training such as apprenticeships.

Note:

1. Compliance with permits may be required in various jurisdictions and typically relates to the operation of plant, machinery and equipment such as elevating work platforms, powder operated fixing tools, power operated tools, vehicles, road signage and traffic control, lifting equipment and the like. Permits may also be required for some work environments such as confined spaces, working aloft, near live electrical apparatus and site rehabilitation.

2. Compliance may be required in various jurisdictions relating to currency in First Aid, confined space, lifting and risk safety measures.

Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

UEENEEE101A	Apply Occupational Health and Safety regulations, codes and practices in the workplace
UEENEEE104A	Solve problems in d.c. circuits
UEENEEH1	Repair basic electronic apparatus faults by

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Prerequisite Unit(s) **4)**

02A	replacement of components
AND	
UEENEEH114A	Solve problems in frequency dependent circuits
OR	
UEENEEE119A	Solve problems in multiple path extra low voltage (ELV) a.c. circuits
OR	
UEENEEH169A	Solve problems in basic electronic circuits
OR	
UEENEEG101A	Solve problems in electromagnetic devices and related circuits
UEENEEG102A	Solve problems in low voltage a.c. circuits

For the full prerequisite chain details for this unit please refer to Table 2 in Volume 1, Part 2

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve competency in this unit if they have reading, writing and numeracy skills indicated by the following scales. Description of each scale is given in Volume 2, Part 3 ‘Literacy and Numeracy’.

Reading	3	Writing	3	Numeracy	3

Employability Skills Information

Employability Skills **5)**

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Employability Skills **5)**

This unit contains Employability Skills

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare to troubleshoot d.c. power supplies.	1.1 OHS procedures for a given work area are obtained and understood.
	1.2 OHS risk control work preparation measures and procedures are followed.
	1.3 The nature of the fault is obtained from documentation or from work supervisor to establish the scope of work to be undertaken.
	1.4 Advice is sought from the work supervisor to ensure the work is co-ordinated effectively with others.
	1.5 Sources of materials that may be required for the work are established in accordance with established procedures.
	1.6 Tools, equipment and testing devices needed to carry out the work are obtained and checked for correct operation and safety.
2 Solve d.c. power	2.1 OHS risk control work measures and procedures

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ELEMENT	PERFORMANCE CRITERIA	
supply problems.		are followed.
	2.2	The need to test or measure live is determined in strict accordance with OHS requirements and when necessary conducted within established safety procedures.
	2.3	Circuits are checked as being isolated where necessary in strict accordance OHS requirements and procedures.
	2.4	Fault finding is approached methodically drawing on knowledge of dc power supplies using measured and calculated values of parameters.
	2.5	Unexpected situations are dealt with safely and with the approval of an authorised person.
	2.6	Fault finding activities are carried out efficiently without unnecessary waste of materials or damage to apparatus and the surrounding environment or services and using sustainable energy practices.
3 Complete work and document problem solving activities.	3.1	OHS work completion risk control measures and procedures are followed.
	3.2	Work site is cleaned and made safe in accordance with established procedures.
	3.3	Justification for solutions used to troubleshooting problems is documented.
	3.4	Work completion is documented and an appropriate person or persons notified in accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

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REQUIRED SKILLS AND KNOWLEDGE

Evidence shall show that knowledge has been acquired of safe working practices and troubleshooting d.c. power supplies with single phase input.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies..

KS01-EH111A Single phase input d.c. power supplies

Evidence shall show an understanding of single phase input d.c. power supplies , applying safe working practices and relevant Standards, Codes and Regulations to an extent indicated by the following aspects

T1. power supplies operating principles and applications

- Power supply function
- Block diagram identifying each sub-system
- Expected waveforms in a power supply
- Constant Voltage
- Constant Current

T2. D.C. rectification circuits

- Junction diode characteristics
- Transformer turns ratio and losses
- Half wave and full wave rectifiers
- Dual rail supply

T3. Filter circuits

- Capacitive and inductive filters
- Ripple

T4. Zener diode regulator

- Zener shunt regulator circuit
- Load and line regulation definitions
- Operating parameters and data sheets

T5. Three terminal regulator circuits

- Need for regulation
- Three terminal regulator characteristics
- Short circuit protection
- Line and load regulation
- Regulated power efficiency
- Remote voltage sensing

T6. Electronic testing and measuring devices and techniques

- Test/measuring devices and their application - analogue and digital multimeters, voltage and digital testers, signal generators and oscilloscopes
- Connection of test/measuring devices into a circuit encompassing:

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REQUIRED SKILLS AND KNOWLEDGE

- safety procedures
- circuit arrangement of test/measuring devices
- Taking readings
- Storage, maintenance and care of test/measuring devices

T7. D.C. power supply testing and fault finding

- Rectifier diode faults
- Zener diode faults
- Three terminal regulator faults

T8. OH&S

- Apply safe working practices and relevant Standards, Codes and Regulations

Evidence Guide

EVIDENCE GUIDE

9) The evidence guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

The Evidence Guide forms an integral part of this unit. It must be used in conjunction with all parts of the unit and performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry-preferred model for apprenticeships. However, where summative (or final) assessment is used it must include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the

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most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Sources of evidence need to be 'rich' in nature to minimise error in judgment.

Activities associated with normal everyday work influence decisions about how/how much the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all prerequisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each Element and associated performance criteria shall be demonstrated on at least two occasions in accordance with the 'Assessment Guidelines – UEE11'. Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices, including the use of risk control measures as specified in the performance criteria and range statement
  - Apply sustainable energy principles and practices as specified in the performance criteria and range statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in this unit. It may be

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required by some jurisdictions that RTOs provide a percentile graded result for the purpose of regulatory or licensing requirements.

- Demonstrate an appropriate level of skills enabling employment
- Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures

- Demonstrated consistent performance across a representative range of contexts from the prescribed items below:
  - Troubleshoot d.c. power supplies with single phase input as described in 8) and including:

A Using methodical problem solving methods.

B Taking measurements correctly and accurately.

C Calculating parameters correctly and accurately.

D Providing solution to power supply problems, and

E Providing written justification for the solutions to problems.

F Dealing with unplanned events by drawing on essential knowledge and skills to provide appropriate solutions incorporated in a holistic assessment with the above listed items.

Note:
Successful completion of relevant vendor training may be used to contribute to evidence on which competency is deemed. In these cases the alignment of outcomes of vendor training with performance criteria and critical aspects of evidence shall be clearly identified.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

These should be part of the formal learning/assessment environment.

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Note:

Where simulation is considered a suitable strategy for assessment, conditions must be authentic and as far as possible reproduce and replicate the workplace and be consistent with the approved industry simulation policy.

The resources used for assessment should reflect current industry practices in relation to troubleshooting d.c. power supplies with single phase input.

Method of assessment

9.4)

This unit shall be assessed by methods given in Volume 1, Part 3 'Assessment Guidelines'.

Note:
Competent performance with inherent safe working practices is expected in the industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no concurrent assessment recommendations for this unit.

The critical aspects of occupational health and safety covered in unit UEENEEE101A and other discipline specific occupational health and safety units shall be incorporated in relation to this unit.

Range Statement

RANGE STATEMENT

10) This relates to the unit as a whole providing the range of contexts and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

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RANGE STATEMENT

This unit shall be demonstrated in relation to troubleshooting d.c. power supplies with single phase input on the rectification section and filtering section of a half wave bridge rectifier and a full wave bridge rectifier.

Generic terms used throughout this Vocational Standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms that apply are given in Volume 2, Part 2.1.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Electronics

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UEENEEI101A Use instrumentation drawings, specification, standards and equipment manuals

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit covers using drawings, specifications, standards and equipment manual applicable to installing, maintaining and fault finding process controls. It encompasses the principles of process control embodied in drawings, standards, specifications and equipment manuals, matching equipment with that specified for a given function and location and determining the connections required between pneumatic, hydraulic and electrical equipment from instrumentation drawings and specifications

Application of the Unit

Application of the Unit **2)**

This unit is intended for competency development in entry-level employment based programs incorporated in approved contracts of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit require a license to practice in the workplace where plant and equipment operate at voltage above 50 V a.c. or 120 V d.c. However other conditions may apply in some jurisdictions subject to regulations related to electrical

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License to practice **3)**

work. Practice in the workplace and during training is also subject to regulations directly related to occupational health and safety and where applicable contracts of training such as apprenticeships.

Note:

1. Compliance with permits may be required in various jurisdictions and typically relates to the operation of plant, machinery and equipment such as elevating work platforms, powder operated fixing tools, power operated tools, vehicles, road signage and traffic control and lifting equipment. Permits may also be required for some work environments such as confined spaces, working aloft, near live electrical apparatus and site rehabilitation.

2. Compliance may be required in various jurisdictions relating to currency in First Aid, confined space and lifting and risk safety measures.

Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

UEENEEE101A	Apply Occupational Health Safety regulations, codes and practices in the workplace`
UEENEEE107A	Use drawings, diagrams, schedules, standards, codes and specifications

For the full prerequisite chain details for this unit please refer to Table 2 in Volume 1, Part 2

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve competency in

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this unit if they have reading, writing and numeracy skills indicated by the following scales. Description of each scale is given in Volume 2, Part 3 'Literacy and Numeracy'

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

This unit contains Employability Skills

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare to use instrumentation drawings, specification, standards and equipment manuals.	1.1 Established OHS risk control measures and procedures are followed.
	1.2 The need for instrumentation drawings, specification, standards or equipment manuals is determined from the nature of the work to be undertaken.
	1.3 Established routines and procedures are followed to obtain instrumentation drawings, specification, standards or equipment manuals

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ELEMENT	PERFORMANCE CRITERIA	
		required for the work to be undertaken.
2 Use instrumentation drawings, specification, standards and equipment manuals	2.1	Instrumentation drawings, specification, standards and/or equipment manuals are selected, appropriate to the work being undertaken.
	2.2	Instrumentation drawings, specification, standards and equipment manuals are interpreted using knowledge of process controls and instrumentation drawing layouts, conventions and symbols.
	2.3	Dimensions are extracted from drawings and diagrams for application to work undertaken.
	2.4	Location of equipment is determined from instrumentation drawings and specification.
	2.5	Connections between pneumatic, hydraulic and electrical equipment are determined from instrumentation drawings and specifications
	2.6	Equipment manuals are reviewed to ascertain their format and where information relevant to the work to be undertaken is located.
	2.7	Information given in equipment manuals is interpreted in relation to the work to be undertaken.
3 Convey instrumentation information and ideas using drawings and diagrams.	3.1	Drawing conventions are used in neat freehand drawings to convey instrumentation information and ideas to others involved in the work to be undertaken.
	3.2	Instrumentation drawing conventions are used to neatly correct freehand original job drawing to show final ‘as-installed’ arrangement.
	3.3	Corrected drawings are forwarded to appropriate person(s) in accordance with established procedures.

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of safe working practices and using instrumentation drawings, specification, standards and equipment manuals.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

KS01-EI101A Concepts and Practices of Industrial Instrumentation

Evidence shall show an understanding of the concepts of industrial instrumentation and the basic practices to an extent indicated by the following aspects:

T1 Industrial Instrumentation encompassing:

- Introduction to the purposes of measurement in industrial processes
- Instrument control loops
- Types of measurement in these processes
- Local and remote measurement
- Measurement signal methods
- Signal transmissions electrical standards
- Signal transmissions pneumatic standards
- Flow, temperature, pressure and other appropriate measurements.
- Identification and purpose of instruments measuring processes directly and those measuring indirectly.
- Instrumentation and control components: sensors, transducers, converters and transmitters.

T2 Instrument Standards encompassing:

- Instrumentation standards
- Relationship between standards
- Using standards
- Fluids in Process Piping Colour Coding.
- Instruments symbols

T3 Instrumentation Terminology and SI units encompassing:

- SI base units
- SI derived units
- Scientific notation and engineering notation
- SI prefixes.
- Instrumentation metric units
- Non-standard SI Units - kg/cm2, etc.
- Conversion of units
- Instrumentation terminology:

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REQUIRED SKILLS AND KNOWLEDGE

- Span
- Range
- Accuracy
- Precision
- Errors
- Zero
- Repeatability
- Sensitivity
- Hysteresis

T4 Calibration of link and lever instruments encompassing:

- Principles of levers and links and calibration of indicator recorder instrument
- Calibration terms
- Calibrate a link and lever instrument
- Interpret calibration data so as to identify the types of error displayed by an instrument and whether the instrument is within its specified accuracy.
- Interpretation of graphs and tables associated with instrumentation

T5 Instrumentation safe working practices encompassing:

- Identification of instrumentation and control hazards
- Risk control measures for instrumentation work.
- Risk assessment

T6 Instrumentation drawings, diagrams and manuals encompassing:

- Electrotechnology drawing symbols for instrumentation and control (electrical/electronic circuits; Instrument circuits/diagrams; PLC diagrams; pneumatic; hydraulic)
- tandards used in Instrumentation drawings (ISA; ASME; AS; SAMA).
- Drawings used in Instrumentation - schematic; single line; wiring; PLC diagrams; process flow diagrams - brief instrument information; process loop diagrams - details, terminals, types of instruments.
- Manufacturers Data Sheets, Manuals, Specifications and Test Procedures - instrumentation Manuals, Catalogues and Drawings.
    - Interpretation of the specifications contained within instrumentation Manuals, Catalogues and Drawings.
    - Interpretation of the test procedures contained within instrumentation Manuals, Catalogues and Drawings.
    - Comparison of data presented in different forms for the same equipment.
    - Identification of data relevant to instrumentation from a range of publicity material.
    - Extraction of information such as calibration, testing or installation procedures from manuals, specification sheets and drawings.

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REQUIRED SKILLS AND KNOWLEDGE

- Quantity take-offs and Parts Lists
  - Part Numbers for components, assemblies and equipment.
  - Parts List for a specified project or installation from Manuals, Catalogues, Specifications and Drawings.
  - List of equipment, required to undertake a specified project or installation, from Manuals, Catalogues, Specifications and Drawings.
  - Identification and extraction of a Part Number for an actual sample component or part from a Manual, Catalogue, Specification and/or Drawing
- Sketching of instrumentation and control drawings:
  - Sketching a schematic circuit diagram from a given circuit board layout diagram, wiring or installation drawing and installation or modification of a specified project using information contained within Manuals,
  - Sketching a part or equipment layout needed to perform a specified task, such as installation or modification, from given Manuals, Catalogues, Specifications and Drawings

Evidence Guide

EVIDENCE GUIDE

9) The evidence guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

The Evidence Guide forms an integral part of this unit. It must be used in conjunction with all parts of the unit and performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment	**9.1)**
	Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the industry-preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. In some circumstances, assessment in part or full can occur outside the

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workplace. However, it must be in accordance with industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Sources of evidence need to be 'rich' in nature to minimise error in judgment.

Activities associated with normal everyday work influence how/how much the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all prerequisites must be met.

Evidence for competence in this unit shall be considered holistically. Each Element and associated performance criteria must be demonstrated on at least two occasions in accordance with the 'Assessment Guidelines – UEE11'. Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices, including the use of risk control measures as specified in the performance criteria and range statement
  - Apply sustainable energy principles and practices as

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specified in the performance criteria and range statement

- Demonstrate an understanding of the essential knowledge and associated skills as described in this unit. It may be required by some jurisdictions that RTOs provide a percentile graded result for the purpose of regulatory or licensing requirements.
- Demonstrate an appropriate level of skills enabling employment
- Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures

- Demonstrated consistent performance across a representative range of contexts from the prescribed items below:
  - Use instrumentation drawings, specification, standards and equipment manuals as described in 8) and including:

A Identifying instrumentation drawings, specification, standards and equipment manuals relevant to the work to be undertaken.

B Interpreting instrumentation drawings, specification, standards and equipment manuals using knowledge of process controls and instrumentation drawing layouts, conventions and symbols.

C Determining location of equipment from instrumentation drawings and specification

D Determining connections between pneumatic, hydraulic and electrical equipment correctly

E Using correct conventions in freehand drawings.

F Giving correct information in freehand drawings.

G Dealing with unplanned event

Context of and specific resources for assessment

9.3)

This unit must be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

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These should be part of the formal learning/assessment environment.

Note: Where simulation is considered a suitable strategy for assessment, the conditions must be authentic and as far as possible reproduce and replicate the workplace and be consistent with the approved industry simulation policy.

The resources used for assessment should reflect current industry practices in relation to instrumentation drawings, specification, standards and equipment manuals

Method of assessment

9.4)

This unit shall be assessed by methods given in Volume 1, Part 3 'Assessment Guidelines'.

Note: Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires assessment in a structured environment which is intended primarily for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

For optimisation of training and assessment effort, competency development in this unit may be arranged concurrently with unit:

UEENEEE107A	Use drawings, diagrams, schedules, standards, codes and specifications

Range Statement

RANGE STATEMENT

10) This relates to the unit as a whole providing the range of contexts and conditions to which the performance criteria apply. It allows for different work environments and

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RANGE STATEMENT

situations that will affect performance.

This unit must be demonstrated in relation to instrumentation assembly, installation, fault finding, maintenance or development work functions using at instrumentation drawings, specification, standards and equipment manuals for least two different process control systems

Generic terms used throughout this Vocational Standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms that apply are given in Volume 2, Part 2.1.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Instrumentation and Control

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UEENEEI107A Install instrumentation and control cabling and tubing

Modification History

		UEENEEI107A	Install instrumentation and control cabling and tubing	
Release	Action	Core/Elective	Details	Points
2	Editorial	N/A	Show full pre-req chain in the unit.	
2	Editorial	N/A	In Pre-requisites, delete "For the full prerequisite chain details for this unit please refer to Table 2 in Volume 1, Part 2".	
2	Editorial	N/A	In Required Skills and Knowledge, insert topic numbering.	
2	Editorial	N/A	Replace “essential knowledge and associated skills” with “required skills and knowledge”.	

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit covers the installation and termination of instrument and control cabling and tubing for chemical, industrial or food processing systems or equipment used in medical procedures. It encompasses working safely and to standards, routing cables and tubing to specified locations, terminating cables and tubing and connecting wiring at accessories and at instruments and control apparatus and completing the necessary installation documentation.

Application of the Unit

Application of the Unit **2)**

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This unit covers the installation and termination of instrument and control cabling and tubing for chemical, industrial or food processing systems or equipment used in medical procedures. It encompasses working safely and to standards, routing cables and tubing to specified locations, terminating cables and tubing and connecting wiring at accessories and at instruments and control apparatus and completing the necessary installation documentation.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit require a license to practice in the workplace where plant and equipment operate at voltage above 50 V a.c. or 120 V d.c. However other conditions may apply in some jurisdictions subject to regulations related to electrical work. Practice in the workplace and during training is also subject to regulations directly related to occupational health and safety and where applicable contracts of training such as apprenticeships.

Note:

1. Compliance with permits may be required in various jurisdictions and typically relates to the operation of plant, machinery and equipment such as elevating work platforms, powder operated fixing tools, power operated tools, vehicles, road signage and traffic control and lifting equipment. Permits may also be required for some work environments such as confined spaces, working aloft, near live electrical apparatus and site rehabilitation.

2. Compliance may be required in various jurisdictions relating to currency in First Aid, confined space and lifting and risk safety measures.

Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

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Prerequisite Unit(s) **4)**

Granting competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed

UEENEEE101A	Apply Occupational Health and Safety regulations, codes and practices in the workplace
UEENEEE107A	Use drawings, diagrams, schedules, standards, codes and specifications
UEENEEI101A	Use instrumentation drawings, specification, standards and equipment manuals

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve competency in this unit if they have reading, writing and numeracy skills indicated by the following scales. Description of each scale is given in Volume 2, Part 3 ‘Literacy and Numeracy’

Reading	3	Writing	3	Numeracy	3

Employability Skills Information

Employability Skills **5)**

This unit contains Employability Skills

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

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Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Prepare to install cabling and tubing	1.1	OHS procedures for a given work area are identified, obtained and understood
	1.2	Health and safety risks are identified, and established risk control measures and procedures in preparation for the work are followed.
	1.3	Safety hazards that have not previously been identified are noted, and established risk control measures are implemented.
	1.4	Installation of cabling and tubing is prepared in consultation with other affected by the work and sequenced appropriately.
	1.5	The nature and location of the work is determined from documentation or appropriate person(s) to establish the scope of work to be undertaken.
	1.6	Cable and tube routes are planned within the constraints of the building and plant structure, significants and regulations.
	1.7	Advice is sought from appropriate persons to ensure the work is coordinated effectively with others.
	1.8	Material needed for the installation work is obtained in accordance with established procedures and checked against job requirements.
	1.9	Tools, equipment and testing devices needed to for the installation work are obtained in accordance with established procedures and

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ELEMENT	PERFORMANCE CRITERIA	
		checked for correct operation and safety.
	1.10	Preparatory work is checked to ensure no damage has occurred and that work complies with requirements.
2 Install cabling, tubing and accessories	2.1	OHS risk control measures and procedures for carrying out the work are followed.
	2.2	Plant/machines/equipment are checked as being isolated where necessary in strict accordance OHS requirements and procedures
	2.3	Cabling, tubing and accessories are installed to comply with technical standards and job specifications and requirements with sufficient excess to affect terminations.
	2.4	Accessories are installed in the required locations and within acceptable tolerances.
	2.5	Cables and conductors are terminated at accessories in accordance with manufacture's specifications and regulatory requirements
	2.6	Tubing is terminated at accessories in accordance with manufacture's specifications and regulatory requirements
	2.7	Established methods for dealing with unexpected situations are discussed with appropriate person or persons and documented.
	2.8	Unexpected situations are dealt with safely and with the approval of an authorised person.
	2.9	Ongoing checks of the quality of installed wiring are undertaken in accordance with established procedures.
	2.10	Cabling and tubing installation is carried out efficiently without waste of materials and energy or damage to apparatus, the surrounding environment or services and using sustainable energy principles.
3 Completion and	3.1	OHS work completion risk control measures and

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ELEMENT	PERFORMANCE CRITERIA	
report installation activities		procedures are followed.
	3.2	Work site is cleaned and made safe in accordance with established procedures.
	3.3	Final checks are made to that the installed wiring conforms to requirements.
	3.4	'As-installed' cables, tubes and accessories are documented and appropriate person(s) notified in accordance with established procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the required skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of safe working practices and installing instrumentation and control cabling and tubing.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

KS01-EI107A Instrumentation and control cables, conductors and tubing

Evidence shall show an understanding of instrumentation and control cables, conductors and tubing to an extent indicated by the following aspects:

T1 Instrumentation cable types and terminations encompassing:

- Cable specifications
- Cable applications
- Cable preparation
- Cable termination
- Connection hardware

T2 Instrumentation pneumatic/hydraulic control tubing/piping encompassing:

- Control tubing/piping
- Pneumatic/hydraulic terms
- Cutting pipe tubing/piping

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REQUIRED SKILLS AND KNOWLEDGE

- Bending, shaping/setting pipe and tubing
- Joining connecting/terminating tubing/piping
- Instrumentation air supply maintenance

Evidence Guide

EVIDENCE GUIDE

9) The evidence guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

The Evidence Guide forms an integral part of this unit. It must be used in conjunction with all parts of the unit and performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the industry-preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. In some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accordance with industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Sources of evidence need to be ‘rich’ in nature to minimise error in judgment.

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Activities associated with normal everyday work influence how/how much the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all prerequisites must be met.

Evidence for competence in this unit shall be considered holistically. Each Element and associated performance criteria must be demonstrated on at least two occasions in accordance with the 'Assessment Guidelines – UEE11'. Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices, including the use of risk control measures as specified in the performance criteria and range statement
  - Apply sustainable energy principles and practices as specified in the performance criteria and range statement
  - Demonstrate an understanding of the required skills and knowledge as described in this unit. It may be required by some jurisdictions that RTOs provide a percentile graded result for the purpose of regulatory or licensing requirements.
  - Demonstrate an appropriate level of skills enabling employment
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated consistent performance across a representative range of contexts from the prescribed items below:

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- Install instrumentation and control cabling and tubing as listed as described in 8) and including:

A Reading and interpreting drawings related to cable and tube layouts, schedules and control apparatus locations

B Routing, placing and securing cables and tubing to comply with requirements

C Placing and securing accessories accurately

D Maintaining fire integrity

E Terminating cables and tubing to comply with requirements

F Dealing with unplanned events by drawing on required skills and knowledge to provide appropriate solutions incorporated in a holistic assessment with the above listed items

Note:

Successful completion of relevant vendor training may be used to contribute to evidence on which competency is deemed. In these cases the alignment of outcomes of vendor training with performance criteria and critical aspects of evidence shall be clearly identified

Context of and specific resources for assessment

9.3)

This unit must be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

These should be part of the formal learning/assessment environment.

Note:

Where simulation is considered a suitable strategy for assessment,

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the conditions must be authentic and as far as possible reproduce and replicate the workplace and be consistent with the approved industry simulation policy.

The resources used for assessment should reflect current industry practices in relation to installing instrumentation and control cabling and tubing.

Method of assessment

9.4)

This unit shall be assessed by methods given in Volume 1, Part 3 'Assessment Guidelines'.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires assessment in a structured environment which is intended primarily for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the required skills and knowledge described in this unit.

Concurrent assessment and relationship with other units

9.5)

For optimisation of training and assessment effort, competency development in this unit may be arranged concurrently with unit:

UEENEEI108A	Install instrumentation and control apparatus and associated equipment

The critical aspects of occupational health and safety covered in unit UEENEEE101A and other discipline specific occupational health and safety units shall be incorporated in relation to this unit.

Range Statement

RANGE STATEMENT

10) This relates to the unit as a whole providing the range of contexts and conditions to which the performance criteria apply. It allows for different work environments and

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RANGE STATEMENT

situations that will affect performance.

This unit must be demonstrated in relation to at least three different wiring systems and two types of tubing.

Note:

1. Examples of wiring systems include armoured cable; fire performance cables e.g. MIMS; thermoplastic insulated cable; thermoplastic sheathed cable; UTP, FTP, STP and coaxial communications cables.

2. Tubing types include low pressure metallic and non-metallic tubing and high pressure tubing

Generic terms used throughout this Vocational Standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms that apply are given in Volume 2, Part 2.1.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Instrumentation and Control

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UEENEEI108A Install instrumentation and control apparatus and associated equipment

Modification History

		UEENEEI108A	Install instrumentation and control apparatus and associated equipment	
Release	Action	Core/Elective	Details	Points
2	Editorial	N/A	Show full pre-req chain in the unit.	
2	Editorial	N/A	In Pre-requisites, Delete “For the full prerequisite chain details for this unit please refer to Table 2 in Volume 1, Part 2”.	
2	Editorial	N/A	In Required Skills and Knowledge, insert topic numbering.	
2	Editorial	N/A	Replace “essential knowledge and associated skills” with “required skills and knowledge”.	

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit covers the installation of measurement, monitoring and control apparatus and associated equipment. It encompasses working safely and to installation standards, matching equipment with that specified for a given location, placing and securing equipment accurately, making required pneumatic, hydraulic and electrical circuit connections and completing the necessary installation documentation.

Application of the Unit

Application of the Unit **2)**

This unit is intended for competency development in

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entry-level employment based programs incorporated in approved contracts of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit require a license to practice in the workplace where plant and equipment operate at voltage above 50 V a.c. or 120 V d.c. However other conditions may apply in some jurisdictions subject to regulations related to electrical work. Practice in the workplace and during training is also subject to regulations directly related to occupational health and safety and where applicable contracts of training such as apprenticeships.

Note:

1. Compliance with permits may be required in various jurisdictions and typically relates to the operation of plant, machinery and equipment such as elevating work platforms, powder operated fixing tools, power operated tools, vehicles, road signage and traffic control and lifting equipment. Permits may also be required for some work environments such as confined spaces, working aloft, near live electrical apparatus and site rehabilitation.

2. Compliance may be required in various jurisdictions relating to currency in First Aid, confined space and lifting and risk safety measures.

Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

UEENEEI101A	Use instrumentation drawings, specification, standards and equipment manuals

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Prerequisite Unit(s) **4)**

For the full prerequisite chain details for this unit please refer to Table 2 in Volume 1, Part 2

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve competency in this unit if they have reading, writing and numeracy skills indicated by the following scales. Description of each scale is given in Volume 2, Part 3 'Literacy and Numeracy'

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

This unit contains Employability Skills

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT **PERFORMANCE CRITERIA**

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ELEMENT	PERFORMANCE CRITERIA	
1 Prepare to instrumentation and control apparatus and associated equipment	1.1	OHS procedures for a given work area are identified, obtained and understood
	1.2	Health and safety risks are identified and established risk control measures and procedures in preparation for the work are followed.
	1.3	Safety hazards that have not previously been identified are noted, and established risk control measures are implemented.
	1.4	Installation of apparatus is prepared in consultation with other affected by the work and sequenced appropriately.
	1.5	The nature and location of the work is determined from documentation or appropriate person(s) to establish the scope of work to be undertaken.
	1.6	Location of instrumentation and control apparatus and associated equipment is planned within the constraints of the building structure, significants and regulations.
	1.7	Advice is sought from appropriate persons to ensure the work is coordinated effectively with others.
	1.8	Material needed for the installation work is obtained in accordance with established procedures and checked against job requirements.
	1.9	Tools, equipment and testing devices needed to for the installation work are obtained in accordance with established procedures and checked for correct operation and safety.
	1.10	Preparatory work is checked to ensure no damage has occurred and that work complies with requirements.
2 Install instrumentation and control apparatus and associated equipment	2.1	OHS risk control measures and procedures for carrying out the work are followed.
	2.2	The need to test or measure live is determined in

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ELEMENT	PERFORMANCE CRITERIA	
		strict accordance with OHS requirements and when necessary conducted within established safety procedures.
	2.3	Circuits/machines/plant are checked as being isolated where necessary in strict accordance OHS requirements and procedures
	2.4	Instrumentation and control apparatus and associated equipment is installed to comply with technical standards and job specifications and requirements with sufficient access to affect terminations, adjustment and maintenance.
	2.5	Wiring and tubing is terminated at instrumentation and control apparatus and associated equipment in accordance with manufacture's specifications and functional and regulatory requirements.
	2.6	Established methods for dealing with unexpected situations are discussed with appropriate person or persons and documented.
	2.7	Unexpected situations are dealt with safely and with the approval of an authorised person.
	2.8	Ongoing checks of the quality of installed apparatus are undertaken in accordance with established procedures.
	2.9	Apparatus installation is carried out efficiently without waste of materials or damage to apparatus, circuits, the surrounding environment or services and using sustainable energy principles.
3 Completion and report installation activities	3.1	OHS work completion risk control measures and procedures are followed.
	3.2	Work site is cleaned and made safe in accordance with established procedures.
	3.3	Final checks are made to that the installed apparatus conforms to requirements.
	3.4	'As-installed' apparatus and associated equipment is documented and appropriate

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ELEMENT	PERFORMANCE CRITERIA
	person(s) notified in accordance with established procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the required skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of safe working practices and installing instrumentation and control apparatus and associated equipment.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

KS01-EI108A **Instrumentation and control equipment installation requirements and techniques**

Evidence shall show an understanding of instrumentation and control equipment installation requirements and techniques to an extent indicated by the following aspects:

T1 Regulatory requirements

- Equipment specification
- Manufacturer’s installation instructions
- System specifications
- Communication/signal cabling installation requirements
- Power wiring requirements
- Initial set up procedures

Evidence Guide

EVIDENCE GUIDE

9) The evidence guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

The Evidence Guide forms an integral part of this unit. It must be used in conjunction with all parts of the unit and performed in accordance with the Assessment Guidelines of this Training Package.

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Overview of Assessment

9.1)

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the industry-preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. In some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accordance with industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Sources of evidence need to be ‘rich’ in nature to minimise error in judgment.

Activities associated with normal everyday work influence how/how much the data gathered will contribute to its ‘richness’. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all prerequisites must be met.

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Evidence for competence in this unit shall be considered holistically. Each Element and associated performance criteria must be demonstrated on at least two occasions in accordance with the 'Assessment Guidelines – UEE11'. Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices, including the use of risk control measures as specified in the performance criteria and range statement
  - Apply sustainable energy principles and practices as specified in the performance criteria and range statement
  - Demonstrate an understanding of the required skills and knowledge as described in this unit. It may be required by some jurisdictions that RTOs provide a percentile graded result for the purpose of regulatory or licensing requirements.
  - Demonstrate an appropriate level of skills enabling employment
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated consistent performance across a representative range of contexts from the prescribed items below:
  - Install instrumentation and control apparatus and associated equipment as listed as described in 8) and including:

A	Reading and interpreting drawings related to and apparatus locations and tubing electrical circuit connections.
B	Placing and securing apparatus accurately
C	Connecting apparatus and associated equipment to comply with requirements.
D	Dealing with unplanned events by drawing on required skills and knowledge to provide appropriate solutions incorporated in a holistic assessment with the above listed items

Context of and specific **9.3)**

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resources for assessment

This unit must be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

These should be part of the formal learning/assessment environment.

Note:

Where simulation is considered a suitable strategy for assessment, the conditions must be authentic and as far as possible reproduce and replicate the workplace and be consistent with the approved industry simulation policy.

The resources used for assessment should reflect current industry practices in relation to installing instrumentation and control apparatus and associated equipment.

Method of assessment

9.4)

This unit shall be assessed by methods given in Volume 1, Part 3 'Assessment Guidelines'.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires assessment in a structured environment which is intended primarily for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the required skills and knowledge described in this unit.

Concurrent assessment and relationship with other units

9.5)

For optimisation of training and assessment effort, competency development in this unit may be arranged concurrently with unit:

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UEENEEE107A	Use drawings, diagrams, schedules, standards, codes and specifications
UEENEEI107A	Install instrumentation and control cabling and tubing

The critical aspects of occupational health and safety covered in unit UEENEEE101A and other discipline specific occupational health and safety units shall be incorporated in relation to this unit.

Range Statement

RANGE STATEMENT

10) This relates to the unit as a whole providing the range of contexts and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance

This unit must be demonstrated in relation to at least four different instrumentation and control apparatus and associated equipment.

- pressure measurement apparatus and systems,
- temperature measurement apparatus and systems,
- level/density measurement apparatus and systems,
- flow measurement apparatus and systems, and
- chemical measurement apparatus and systems.

Generic terms used throughout this Vocational Standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms that apply are given in Volume 2, Part 2.1.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Instrumentation and Control

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UEENEEI116A Assemble, enter and verify operating instructions in microprocessor equipped devices

Modification History

		UEENEEI116A	Assemble, enter and verify operating instructions in microprocessor equipped devices	
Release	Action	Core/Elective	Details	Points
2	Editorial	N/A	Show full pre-req chain in the unit.	
2	Editorial	N/A	In Required Skills and Knowledge, insert topic numbering.	
2	Editorial	N/A	Replace “essential knowledge and associated skills” with “required skills and knowledge”.	

Unit Descriptor

Unit Descriptor

1) Scope:

1.1) Descriptor

This unit covers assembling and entering instructions in microprocessor-equipped devices (embedded system) with simple built-in programming function and verifying that the device operates as intended. It encompasses safe working practices, checking device installation, following written and oral instruction and procedures and completing necessary documentation.

Note:

Examples of devices are simple programmable relays, timers, temperature controllers, switches and basic detection devices for security and fire the like.

Application of the Unit

Application of the Unit

2)

This unit is intended for competency development

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entry-level employment-based programs incorporated in approved contracts of training. It may be used to augment previously acquired competencies.

Note:

1. Compliance with permits may be required in various jurisdictions and typically relates to the operation of plant, machinery and equipment such as elevating work platforms, powder operated fixing tools, power operated tools, vehicles, road signage and traffic control, lifting equipment. Permits may also be required for some work environments such as confined spaces, working aloft, near live electrical apparatus, site rehabilitation.

2. Compliance may be required in various jurisdictions relating to currency in First Aid, confined space, lifting and risk safety measures.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a license to practice in the workplace. However, practice in this unit is subject to regulations directly related to occupational health and safety and where applicable contracts of training such as apprenticeships.

Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

UEENEEE101A	Apply Occupational Health Safety regulations, codes and practices in the workplace

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Literacy and numeracy skills	**4.2)**

Participants are best equipped to achieve competency in this unit if they have reading, writing and numeracy skills indicated by the following scales. Description of each scale is given in Volume 2, Part 3 ‘Literacy and Numeracy’

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills	**5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare to assemble and enter operating instructions.	1.1 OHS procedures for a given work area are identified, obtained and understood through established routines and procedures.
	1.2 Established OHS risk control measures and procedures are followed in preparation for the work.

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ELEMENT		PERFORMANCE CRITERIA	
		1.3	Safety hazards that have not previously been identified are reported and advice on risk control measures is sought from the work supervisor.
		1.4	Work supervisor or customers are consulted to determine which functions of the device are to be use and the parameter of each
		1.5	Tools, equipment and testing devices needed to carry out the work are obtained and checked for correct operation and safety.
		1.6	Device installation is checked for compliance with job specification and regulations where they apply.
2	Assemble and enter operating instructions.	2.1	Established OHS risk control measures and procedures for carrying out the work are followed.
		2.2	Circuits/machines/plant are checked as being isolated where necessary in strict accordance OHS requirements and procedures.
		2.3	The required status of each function of the device is entered and their parameters set in accordance with manufacturer programming instructions.
		2.4	Entered data are checked as meeting those specified by the work supervisor or customer.
		2.5	Procedures for referring non-routine events to immediate supervisor for directions are followed.
		2.6	Tools, equipment and testing devices needed to carry out the work are obtained and checked for correct operation and safety.
3	Test device operation and report.	3.1	Device operation is tested in strict accordance OHS requirements and procedures.
		3.2	Operating anomalies are identified and corrected in accordance with established routines.
		3.3	OHS work completion risk control measures and

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ELEMENT	PERFORMANCE CRITERIA	
		procedures are followed.
	3.4	Work site is cleaned and made safe in accordance with established procedures.
	3.5	Work completion is reported and appropriate person(s) notified in accordance with established routines.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the required skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of safe working practices and entering and verifying operating instruction in basic microprocessor equipped devices.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

KS01-EI116A Microprocessor equipped devices

Evidence shall show an understanding of microprocessor equipped devices to an extent indicated by the following aspects:

T1 Overview of digital controllers

- types
- block diagram of controller
- applications
- terms

T2 Controller input and output equipment

- input sensors (transducers)
- current loop concepts
- output current and voltage ratings
- supplementary solid state relays/ contactors

T3 Installation of controllers

- types of input sensors
- wiring

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REQUIRED SKILLS AND KNOWLEDGE

- mounting techniques
- terminal types
- output current protection

T4 Configuration and digital controller set-up

- operator interfaces
- manufacturer's data
- testing

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the unit and must be read in conjunction with the performance criteria and the range statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this unit. It must be used in conjunction with all parts of this unit and performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the industry-preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accordance with industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being

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assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Sources of evidence need to be 'rich' in nature to minimise error in judgment.

Activities associated with normal everyday work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all prerequisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated performance criteria shall be demonstrated on at least two occasions in accordance with the 'Assessment Guidelines – UEE11. Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices, including the use of risk control measures as specified in the performance criteria and range statement
  - Apply sustainable energy principles and practices as specified in the performance criteria and range statement
  - Demonstrate an understanding of the required skills and knowledge as described in this unit. It may be required by some jurisdictions that RTOs provide a percentile graded result for the purpose of regulatory or licensing requirements.

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- Demonstrate an appropriate level of skills enabling employment
- Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures

- Demonstrated consistent performance across a representative range of contexts from the prescribed items below:
  - Enter and verify operating instructions in microprocessor equipped devices as described in 10) and including:

A Understanding required operating functions and parameters.

B Identifying non-compliance conditions of device installation.

C Entering functions and parameters correctly.

D Correcting programming anomalies.

E Testing and verify device operation.

F Dealing with unplanned events by drawing on required skills and knowledge to provide appropriate solutions incorporated in a holistic assessment with the above listed items.

Note:

Successful completion of relevant vendor training may be used to contribute to evidence on which competency is deemed. In these cases the alignment of outcomes of vendor training with performance criteria and critical aspects of evidence shall be clearly identified.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed in this unit.

These should be used in the formal learning/assessment

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environment.

Note:

Where simulation is considered a suitable strategy for assessment, conditions for assessment must be authentic and as far as possible reproduce and replicate the workplace and be consistent with the approved industry simulation policy.

The resources used for assessment should reflect current industry practices in relation to enter and verifying operating instructions in microprocessor equipped devices.

Method of assessment

9.4)

This unit shall be assessed by methods given in Volume 1, Part 3 'Assessment Guidelines'.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires assessment in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the required skills and knowledge described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no concurrent assessment recommendations for this unit.

Range Statement

RANGE STATEMENT

10) This relates to the unit as a whole providing the range of contexts and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

This unit shall be demonstrated in relation to assembling, entering and verifying operating instruction in at least two types of microprocessor equipped devices with built-in icon-based programmable functions such as programmable relays, timers,

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RANGE STATEMENT

temperature controllers, detection devices for security and fire.

Generic terms used throughout this Vocational Standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms that apply are given in Volume 2, Part 2.1.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Instrumentation and Control

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UEENEEI150A Develop, enter and verify discrete control programs for programmable controllers

Modification History

		UEENEEI150A	Develop, enter and verify discrete control programs for programmable controllers	
Release	Action	Core/Elective	Details	Points
2	Editorial	N/A	In Pre-requisites, delete “For the full prerequisite chain details for this unit please refer to Table 2 in Volume 1, Part 2”.	
2	Editorial	N/A	In Required Skills and Knowledge, insert topic numbering.	
2	Editorial	N/A	Replace “essential knowledge and associated skills” with “required skills and knowledge”.	

Unit Descriptor

Unit Descriptor

1) Scope:

1.1) Descriptor

This unit covers development, installation and testing of programs for programmable controllers (PLC) for a system requiring discrete control functions. It encompasses working safely, applying knowledge of control systems, control system development methods, using ladder diagrams/statement list/function block diagram instruction sets, following written instructions and documenting program development and testing activities.

Application of the Unit

Application of the Unit

2)

This unit is intended to augment formally-acquired competencies. It is suitable for employment-based

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programs under an approved contract of training.

Note:

1. Compliance with permits may be required in various jurisdictions and typically relates to the operation of plant, machinery and equipment such as elevating work platforms, powder operated fixing tools, power operated tools, vehicles, road signage and traffic control, lifting equipment. Permits may also be required for some work environments such as confined spaces, working aloft, near live electrical apparatus, site rehabilitation.

2. Compliance may be required in various jurisdictions relating to currency in First Aid, confined space, lifting and risk safety measures.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a license to practice in the workplace. However, practice in this unit is subject to regulations directly related to occupational health and safety and where applicable contracts of training such as apprenticeships.

Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Unit Code	Unit Title
UEENEEE101A	Apply Occupational Health and Safety regulations, codes and practices in the workplace

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Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve competency in this unit if they have reading, writing and numeracy skills indicated by the following scales. Description of each scale is given in Volume 2, Part 3 'Literacy and Numeracy'

Reading 4 Writing 4 Numeracy 4

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare to develop enter and verify program.	1.1 OHS procedures for a given work area are identified, obtained and understood through established routines and procedures.
	1.2 Established OHS risk control measures and procedures are followed in preparation for the work.

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ELEMENT	PERFORMANCE CRITERIA	
	1.3	Safety hazards that have not previously been identified are reported and advice on risk control measures is sought from the work supervisor.
	1.4	Control system scenario is determined from job specifications of the process/plant/machine to be controlled, and through consultation with appropriate person(s).
	1.5	Equipment, software and testing devices needed to carry out the work are obtained and checked for correct operation and safety.
	1.6	Installation of programmable controller is checked for compliance with regulations and job specification.
2 Develop control system and enter and test program.	2.1	Established OHS risk control measures and procedures for carrying out the work are followed.
	2.2	Circuits/machines/plant are checked as being isolated where necessary in strict accordance OHS requirements and procedures.
	2.3	Control solutions are developed and documented based on the specified control mode and using acceptable methods for designing control systems.
	2.4	Developed control system is converted to an appropriate form, such as flow, state and ladder diagrams(See Note 1)
	2.5	Program is entered into the programmable control using a personal computer and appropriate software.
	2.6	Entered instructions and settings are tested as meeting those specified in by the control system scenario.
	2.7	Appropriate methods and tools are used to

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ELEMENT	PERFORMANCE CRITERIA	
		test control systems and operating faults and anomalies are identified and rectified. (See Note 2)
	2.8	Methods for dealing with unexpected situations are selected on the basis of safety and specified work outcomes.
3 Verify, document and report programming activities.	3.1	OHS work completion risk control measures and procedures are followed.
	3.2	Program is transferred from a programmable controller to an external medium for storage. (See Note 3)
	3.3	Control system specification and program are documented in accordance with established procedures.
	3.4	Work completion is reported and appropriate personnel notified in accordance with established procedures.

Note.

1. Example of control functions are derived timers (off delay, self resetting, constant duty cycle), reversible counters, cascading timers, cascading counters, combining timers and counters, internal relays/flags/markers, latching relays (set/reset), jump instructions, master control instructions, bit shift registers, scan time considerations, one shot, retentive (power fail) functions, simple step sequence instructions

2. Examples of control system testing methods and tools are monitor mode as an aid to fault finding, inbuilt hardware/software diagnostics and use of error codes.

3. Examples of storage mediums are IC storage, hard disks, servers.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

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REQUIRED SKILLS AND KNOWLEDGE

8) This describes the required skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of safe working practices and developing, entering and verifying discrete control programs for programmable logic controllers.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

KS01-EI150A Programmable controller

Evidence shall show an understanding of programmable controller to an extent indicated by the following aspects:

T1. PLC Introduction encompassing:

- Evolution of the programmable controller and applications
- Relay control, static logic control and programmable control
- Programmable controller block diagram (Inputs and Outputs)
- Programmable controller advantages
- Programmable controller symbols
- Programmable controller functions
- Numbering systems start-up procedures
- Programming inputs and outputs
- Operation of programmable controller inputs
- PLC operation: scan cycle
- Basic programming

T2. Types of PC programs encompassing:

- Ladder diagrams
- Basic Programming
- Program modification
- Ladder diagram development
- Connecting the programmable controller.

T3. Programming Timers encompassing:

- Purpose of timers
- Timer instructions
- On-delay timer instruction
- Off-delay timer instruction
- Programming timers
- Retentive and non-retentive timers
- Cascading timers
- The self-resetting timer
- Monitoring timers

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REQUIRED SKILLS AND KNOWLEDGE

- Circuit conversion

T4. Programming Counters encompassing:

- Counter instructions
- Retentive and non-retentive counter
- Programming counters
- Up/down counters
- Self resetting counter
- Cascading counters
- Circuit conversion

T5. Program Storage encompassing:

- PLC terms
- Memory
- Using the PROM pack
- Printing ladder diagrams

T6. PLC Input and Output Modules encompassing:

- Purpose of modules

T7 PLC input modules:

- dry contact input modules;
- AC input modules, DC input modules;
- Analog input modules

T8 Output modules:

- relay output;
- Triac output;
- transistor output;
- analog output modules

T9. PLC Installation Requirements encompassing:

- Installation precaution
- Safety systems
- AS/NZS requirements
- Mounting the PLC
- Installation documentation
- Routing signal and power cables
- Locating PLCs and I/O
- Earthing Requirements

T10. Master Control encompassing:

- Master control relay
- Master control relay ladder diagram

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REQUIRED SKILLS AND KNOWLEDGE

- Programming master control relays

T11. Jump Function encompassing:

- Jump function
- Jump function ladder diagram
- Programming jump functions

T12. The Shift Register encompassing:

- Purpose of Registers
- The shift register
- Shift register operation
- Clock input
- Shift register requirements
- Programming shift registers

T13. The Step Sequencer encompassing:

- Step Sequencers
- Step sequencer operation
- Clock input
- Step Sequencer requirements
- Programming step sequencer

T12. PLC Diagnostics and Fault Finding encompassing:

- PLC Fault Finding
- Controller Status
- I/O Faults
- Program Faults

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the unit and must be read in conjunction with the performance criteria and the range statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this unit. It must be used in conjunction with all parts of this unit and performed in accordance with the Assessment Guidelines of this Training Package.

Overview of 9.1)

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Assessment

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the industry-preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accordance with industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Sources of evidence need to be 'rich' in nature to minimise error in judgment.

Activities associated with normal everyday work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all prerequisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated performance criteria

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shall be demonstrated on at least two occasions in accordance with the 'Assessment Guidelines – Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices, including the use of risk control measures as specified in the performance criteria and range statement
  - Apply sustainable energy principles and practices as specified in the performance criteria and range statement
  - Demonstrate an understanding of the required skills and knowledge as described in this unit. It may be required by some jurisdictions that RTOs provide a percentile graded result for the purpose of regulatory or licensing requirements.
  - Demonstrate an appropriate level of skills enabling employment
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated consistent performance across a representative range of contexts from the prescribed items below:
  - Develop, enter and verify programs for programmable controllers as described in 8) and including:

A	Developing a control system solution to the required operating functions and parameters.
B	Identifying non-compliance conditions of device installation.
C	Converting control system to a PLC program.
D	Entering programming functions and parameters correctly.
E	Transferring programs to a PLC.
F	Correcting programming anomalies.
G	Testing and verify control system operation.
H	Transferring program to external storage.

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I	Documenting control system and programming clearly.
J	Dealing with unplanned events by drawing on required skills and knowledge to provide appropriate solutions incorporated in a holistic assessment with the above listed items.

Note:

Successful completion of relevant vendor training may be used to contribute to evidence on which competency is deemed. In these cases the alignment of outcomes of vendor training with performance criteria and critical aspects of evidence shall be clearly identified.

Context of and specific resources for assessment **9.3)**

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed in this unit.

These should be used in the formal learning/assessment environment.

Note:

Where simulation is considered a suitable strategy for assessment, conditions for assessment must be authentic and as far as possible reproduce and replicate the workplace and be consistent with the approved industry simulation policy.

The resources used for assessment should reflect current industry practices in relation to developing, entering and verifying programs for programmable logic controllers using ladder instrument set.

Method of assessment **9.4)**

This unit shall be assessed by methods given in Volume 1, Part 3 ‘Assessment Guidelines’.

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Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires assessment in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the required skills and knowledge described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no concurrent assessment recommendations for this unit.

Range Statement

RANGE STATEMENT

10) This relates to the unit as a whole providing the range of contexts and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

This unit shall be demonstrated in relation to developing, entering and verifying programs for programmable logic controllers. The program shall include at least five of the following functions/controls:

- Derived timers (off delay)
- Self resetting
- Constant duty cycle
- Reversible counters
- Cascading timers
- Cascading counters
- Combining timers and counters
- Internal relays/flags/markers
- Latching relays (set/reset)
- Jump instructions
- Master control instructions
- Bit shift registers
- Scan time considerations
- One shot

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RANGE STATEMENT

- Retentive (power fail) functions
- Simple step sequence instructions

Generic terms used throughout this Vocational Standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms that apply are given in Volume 2, Part 2.1.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Instrumentation and Control

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UEENEEK142A Apply environmentally and sustainable procedures in the energy sector

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This competency standard unit requires the worker to undertake methods of work practice that minimises energy and material usage and to seek energy reduction strategies in the energy sector workplace. The unit seeks to minimise negative impacts on the environment.

Application of the Unit

Application of the Unit **2)**

This competency standards unit shall apply to persons entering work in energy sector and may be used in school based vocational programs.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practice in the work place. However practice in this unit is subject to regulations directly related to occupational health and safe and contracts of training such as new apprenticeships and the like.

Note:

1. Compliance with permits may be required in various jurisdictions and typically relates to the operation of plant, machinery and equipment such as elevating work

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License to practice **3)**

platforms, powder operated fixing tools, power operated tools, vehicles, road signage and traffic control, lifting equipment and the like. Permits may also be required for some work environments such as confined spaces, working aloft, near live electrical apparatus, site rehabilitation and the like.

2. Compliance may be required in various jurisdictions relating to currency in first aid, confined space, lifting, risk safety measure and the like

Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

There are no prerequisite competencies for this unit

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and maths skills indicated by the following scales. Description of each scale is given in Volume 2, Part 3 “Literacy and Numeracy”

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

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Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT		PERFORMANCE CRITERIA	
1	Plan and prepare to apply sustainable work practice	1.1	Activities are planned and prepared for to ensure OHS policies and procedures are followed with the work appropriately sequenced in accordance with requirements
		1.2	Appropriate personnel are consulted to ensure the work is co-ordinated effectively with others involved
		1.3	Materials are obtained and checked in accordance with established procedures and to comply with requirements
		1.4	Location in which activities are to be undertaken is determined from requirements
		1.5	Materials necessary to complete the work are obtained in accordance with established procedures and checked against job requirements
		1.6	Workplace environmental risks and resource efficiency issues are identified
2	Apply sustainable work practice	2.1	OHS policies and procedures for undertaking administrative functions are followed
		2.2	Activities are undertaken in accordance with requirements to implement techniques which produce energy reduction directly or indirectly
		2.3	Unplanned events or conditions are responded to in accordance with established procedures
		2.4	Approval is obtained in accordance with established procedures from appropriate personnel before any contingencies are

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ELEMENT	PERFORMANCE CRITERIA	
		implemented
	2.5	On-going checks of the quality of the work are undertaken in accordance with established procedures
	2.6	Work is carried out efficiently without unnecessary waste of materials or damage to the surrounding environment, while using sustainable work practices which minimise wastage of energy and materials either directly or indirectly
3 Complete the application of sustainable work practice	3.1	Documentation/reports are completed to ensure detailed promotional activities requirements are met
	3.2	Suggestions are made for improvements to workplace practices to minimise energy and materials wastage
	3.3	Completion is notified in accordance with established procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of safe working practices and applying environmentally and sustainable work practices in the energy sector.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

KS01-EK142A Environmentally and sustainable work practice

Evidence shall show an understanding of environmentally and sustainable work practices to an extent indicated by the following aspects:

T1 Sustainable work practices encompassing:

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REQUIRED SKILLS AND KNOWLEDGE

- Notion of sustainable work practice
- Effects of neglecting sustainable work practice
- The greenhouse effect - causes, consequences.
- International and national greenhouse imperatives.
- The role of regulators and similar bodies
- Legislative requirements
- Economic benefits of sustainable initiatives.

T2 Techniques for reducing carbon produced energy and hence greenhouse gases encompassing:

- domestic, commercial and industrial strategies
- trade related technologies and methods
- energy efficient retrofits (overview).
- renewable energy technologies (overview)

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the performance criteria and the range statement of the unit of competency and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord

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with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

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Before the critical aspects of evidence are considered all prerequisites shall be met.

The evidence on which competency in this unit is based shall be considered holistically for each element on at least two occasions comprising:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the performance criteria and range; and
  - Apply sustainable work practice principles and practices as specified in the performance criteria and range; and
  - Demonstrate an understanding of the essential knowledge and associated skills as described in this unit. It may be required by some jurisdictions that RTOs provide a percentile graded result for the purpose of regulatory or licensing requirements. and
  - Demonstrate an appropriate level of skills enabling employment; and
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures; and
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - Participate in environmentally sustainable work practices as listed in the Range statement' and including:

A Apply sustainable work practice in daily work activities

B Dealing with unplanned events by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items

Note:

Successful completion of relevant vendor training may be used to contribute to evidence on which competency is deemed. In these cases the alignment of outcomes of vendor training with performance criteria and critical aspects of evidence shall be clearly identified

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Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this competency standard unit.

Resources required to assess this unit are listed above in Context of assessment', which should also be used in the formal learning/assessment environment.

Note:

Where simulation is considered a suitable strategy for assessment it must ensure that the conditions for assessment are authentic and as far as possible reproduce and replicate the workplace and is consistent with the approved industry simulation policy.

In addition to the resources listed above in Context of and specific resources for assessment, evidence should show demonstrated competency in participating in environmentally sustainable work practices.

Method of assessment

9.4)

This competency standard unit shall be assessed by methods given in Volume 1, Part 3 "Assessment Guidelines".

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this competency standard unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent

9.5)

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assessment and relationship with other units

There are no concurrent assessment recommendations for this unit.

Range Statement

RANGE STATEMENT

10) This relates to the unit of competency as a whole providing the range of contexts and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

This competency standard unit shall be demonstrated in relation to participating in environmentally sustainable work practices in any of the following disciplines:

- Appliances
- Business equipment
- Computers
- Data Communications
- Electrical
- Electronics
- Fire protection
- Instrumentation and control
- Refrigeration and Air Conditioning
- Renewable / sustainable energy
- Security technology

Generic terms are used throughout this Vocational Standard shall be regarded as part of the Range of Variables in which competency is demonstrated. The definition of these and other terms that apply are given in Volume 2, Part 2.1.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Renewable and Sustainable Energy

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UEENEEK145A Implement and monitor energy sector environmental and sustainable policies and procedures

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This Competency Standard Unit specifies the outcomes for the collecting, interpretation and application of environmental management information, the identification of environmental impacts and the assessment of risks. It also consists of monitoring while implementing environmentally sustainable work polices and plans an, the development of modifications as part of the review process.

Application of the Unit

Application of the Unit **2)**

This Competency Standard Unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training. The unit addresses information processes and techniques for the implementation and monitoring of work place procedures that minimise energy use in the workplace.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit may require a licence/registration to practice in the work place subject to regulations for undertaking of electrical work.

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License to practice **3)**

Practice in workplace and during training is also subject to regulations directly related to Occupational Health and Safety, electricity/telecommunications/gas/water industry safety and compliance, industrial relations, environmental protection, anti discrimination and training. Commonwealth, State/Territory or Local Government legislation and regulations may exist that limits the age of operating certain equipment.

Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

There are no pre-requisites for this unit

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and maths skills indicated by the following scales. Description of each scale is given in Volume 2, Part 3 “Literacy and Numeracy”

Reading 4 Writing 4 Numeracy 4

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

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Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Prepare/plan to implement and monitor environmentally sustainable work practice management policies and procedures	1.1	Works schedule(s), including drawings, plans, requirements, established procedures, and material lists, are obtained, analysed, if necessary, by site inspection and the extent of the preparation of the work determined for planning and coordination.
	1.2	Work is prioritised and sequenced for the most efficient and effective outcome following consultation with others for completion within acceptable timeframes, to a quality standard and in accordance with established procedures.
	1.3	Relevant requirements (including environmental regulations) and established procedures for the work are given to all personnel and identified for all work sites.
	1.4	Hazards are identified, OHS risks assessed and control measures are prioritised, implemented and monitored to ensure safe systems of work are followed and according to established procedures.
	1.5	Resources including personnel, equipment, tools and personal protective equipment required for the job are identified, scheduled and coordinated and confirmed in a safe and technical working order.
	1.7	Risk management is applied to the job identifying and itemising ways in which energy wastage can be minimised
	1.8	Items for installation are sourced, where

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ELEMENT	PERFORMANCE CRITERIA	
		possible, that are recycled or reusable, in consultation with an agreement of the customer.
2 Carry out the implementation and monitoring of environmentally sustainable work management policies and procedures	2.1	Environmentally sustainable work practice to reduce/ minimise waste and excessive energy use are implemented and monitored in accordance with requirements and/or established procedures with input being sought from specialists where possible
	2.2	Implementation and monitoring of environmentally sustainable energy management policies and procedures are carried out, in accordance with the work schedule and requirements and/or established procedures.
	2.3	Essential Knowledge and Associated Skills in the safe implementation and monitoring of environmental and sustainable energy management policies and procedures are applied to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements.
	2.4	Solutions to non-routine problems are identified and actioned using acquired Essential Knowledge and Associated Skills according to requirements.
	2.5	Ongoing checks of quality of the work are undertaken in accordance with requirements and established procedures to ensure a quality like outcome is achieved for the client/customer and to a community/industry standard.
3 Complete the implementation and monitoring of environmental and sustainable energy management policies and procedures	3.1	Work undertaken is checked against works schedule for conformance with requirements, anomalies reported and solutions identified in accordance with established procedures.
	3.2	Work site is rehabilitated, cleaned up and confirmed safe in accordance with established procedures.
	3.3	Tools, equipment and any surplus resources and materials are, where appropriate, cleaned, checked and returned to storage in accordance

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ELEMENT	PERFORMANCE CRITERIA	
		with established procedures.
	3.4	Materials suitable for recycling and or reuse are identified and are stored for further use or proper disposal.
	3.5	Policies for implementing and monitoring of sustainable work practices are reviewed and updated from the experience of the current job and new procedures implemented if required.
	3.6	Relevant work permit(s) are signed off and the work completed/returned to service and advised to client/customer in accordance with requirements.
	3.7	New targets for energy minimisation are set, in keeping with successful strategies
	3.8	Successful strategies are promoted and where possible participants rewarded

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired implementing & monitoring, policies & procedures for environmentally sustainable electrotech work practice.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

KS01-EK145A Environmental and sustainable work practice - supervisory responsibilities

Evidence shall show an understanding of environmentally sustainable work practice, supervisory responsibilities to an extent indicated by the following aspects:

T1 Environmentally sustainable work practice principles encompassing:

- Provisions of relevant environmental legislation

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REQUIRED SKILLS AND KNOWLEDGE

- Notion of sustainable work practice
- Effects of neglecting sustainable work practice
- The greenhouse effect - causes, consequences.
- International and national greenhouse imperatives.
- The role of regulators and similar bodies
- Economic benefits of sustainable initiatives.
- Techniques for reducing the use of carbon based energy sources and hence greenhouse gas emissions
- domestic, commercial and industrial strategies
- trade related technologies and methods
- renewable energy technologies
- energy efficient retrofits

T2 Implementing and monitoring encompassing:

- Principles and practice of effective sustainable work practice management
- Workplace sustainable work practice non compliance, range and selection of control measures
- Organisational systems and policies and procedures needed for legislative compliance
- Impact of characteristics and composition of the workforce on sustainable work practice management
- Relevance of sustainable work practice management to other organisational management policies, procedures and systems.
- Analysis of entire work environment and judge sustainable work practice interventions
- Analysis of relevant workplace data
- Ability to assess resources needed for risk control.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the performance criteria and the range statement of the unit of competency and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

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Overview of Assessment **9.1)**

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit **9.2)**

Before the critical aspects of evidence are considered all

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prerequisites shall be met.

The evidence on which competency in this unit is based shall be considered holistically for each element on at least two occasions comprising:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the performance criteria and range; and
  - Apply sustainable energy principles and practices as specified in the performance criteria and range; and
  - Demonstrate an understanding of the essential knowledge and associated skills as described in this unit. It may be required by some jurisdictions that RTOs provide a percentile graded result for the purpose of regulatory or licensing requirements. and
  - Demonstrate an appropriate level of skills enabling employment; and
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures; and
  - Implement and monitor, policies and procedures for environmentally and sustainable electrotech work practice as listed in the Range statement' and including

A Providing environmentally sustainable work practice information to the work group

B Implementing and monitoring participative arrangements for the management of environmentally sustainable work practice

C Implementing and monitoring the procedures for identifying procedures for identifying hazards, assessing risks and controlling risks

D Implementing the procedures for dealing with hazardous events

E Implementing and monitoring the procedures for environmentally sustainable work practice

F Implementing and monitoring the procedures for maintaining environmentally sustainable work

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	practice records
G	Dealing with unplanned events by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual implementation and monitoring of environmental and sustainable energy management policies and procedures.

The resources used for assessment should reflect current industry practices in relation to implementing and monitoring, policies and procedures for environmentally and sustainable electrotech work practice.

Method of assessment

9.4)

This Competency Standard Unit shall be assessed by methods given in Volume 1, Part 3 “Assessment Guidelines”.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this Competency Standard Unit applies. This requires that the specified Essential Knowledge and Associated Skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent

9.5)

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assessment and relationship with other units

For optimisation of training and assessment effort, competency development in this unit may be arranged concurrently with units:

UEENEEE117A	Implement and monitor energy sector OHS policies and procedures

Range Statement

RANGE STATEMENT

10) This relates to the unit of competency as a whole providing the range of contexts and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

This Competency Standard Unit shall/may be demonstrated in relation to implementing and monitoring, policies and procedures for environmentally and sustainable electrotech work practice and may include the following equipment:

The following constants and variables included in the elements and performance criteria in this unit augment other definitions described in the Definitions section of this Training Package and form an integral part of the Range Statement of this unit:

- Environmental legislation may include relevant federal legislation; relevant state/territory legislation; relevant local government by-laws; relevant government or quasi government policies and regulations; relevant community planning and development agreements (e.g. Land care agreements)
- Environmental management documentation may include information on applicable environmental laws or other requirements; complaint records; training records; process information; process operational log books; inspection, maintenance and calibration records; relevant contractor and supplier information; incident reports; information on emergency preparedness and response.

Generic terms used throughout this Vocational Standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms that apply are given in Volume 2, Part 2.1.

Unit Sector(s)

Not applicable.

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Competency Field

Competency Field **11)**

Renewable and Sustainable Energy

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UETTDREL16A Working safely near live electrical apparatus

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This Competency Standard Unit covers compliance with working safely up to the defined "safe approach distance" near energised electrical apparatus (inc. electrical powerlines) for electrical worker. It includes work functions that may be performed, such as vegetation control, scaffolding, rigging, painting, and/or any other activity that requires working safely and complying with requirements and/or established procedures near live electrical apparatus by an electrical worker. Also included is the preparation of risk assessment control measures that encompass job safety assessment. It does not include any work that is or may be performed by other competent operatives within the defined "safe working zone". The defined "safe working zone" is that so defined by relevant State or Territory regulatory agencies/bodies, local government legislation, Industry bi-partite body – Guidelines/Codes of Practices or other related requirements for Safe work and access near live Electrical and Mechanical Apparatus.

Application of the Unit

Application of the Unit **2)**

This competency standards unit shall apply to Transmission, Distribution, Rail Traction, Telecommunications and Vegetation Management Control industry sectors.

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Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit may require a licence/registration to practice in the work place subject to regulations for undertaking of electrical work. Practice in workplace and during training is also subject to regulations directly related to Occupational Health and Safety, electricity/telecommunications/gas/water industry safety and compliance, industrial relations, environmental protection, anti discrimination and training. Commonwealth, State/Territory or Local Government legislation and regulations may exist that limits the age of operating certain equipment.

Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed plus all the competencies in one (1) of the identified Pathway Unit Group(s):

There are no prerequisite competencies to this unit.

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following scales. Description of each scale is given in Volume 2, Part 3 “Literacy and Numeracy”.

Reading 3 Writing 3 Numeracy 3

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Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare to work safely near live electrical apparatus as electrical worker	1.1 Instructions related to the work to be performed safely near live electrical apparatus as electrical worker are received and confirmed.
	1.2 Relevant requirements and established procedures to be followed and, relevant personnel to be communicated with for the work to be performed are identified.
	1.3 OHS policies and procedures to be followed for the work to be performed are received and confirmed.
	1.4 Suggestions to assist in meeting the safety requirements for working near live electrical apparatus as an electrical worker are made to others involved in the work.
	1.5 Hazards are identified, OHS risks assessed and control measures are prioritised, implemented and monitored including emergency exits kept clear according to established procedures.

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ELEMENT		PERFORMANCE CRITERIA	
		1.6	Scope of responsibility and process of relevant work permit(s) issue is identified, received and confirmed according to requirements and established procedures.
		1.7	Relevant responsibility associated with First Aid, Safety Observers and/or other related work safety procedures at the worksite are identified in accordance with requirements and established procedures to ensure safety measures are followed in the instance of an incident.
		1.8	Processes for identifying and reporting client issues to appropriate personnel in accordance with industry/acceptable /community standards are identified.
		1.9	Site and the work schedule to be prepared are confirmed according to given instructions for a quality outcome and to minimise risk and damage to property, commerce, stock and individuals in accordance and established procedures.
		1.10	Electricity infrastructure assets, related voltages and requirements for working safely near live electrical apparatus as electrical worker are identified.
		1.11	Safe approach distances including any zones thereof that may apply, as defined in industry guidelines, requirements and/or established procedures for the intended work are confirmed.
2	Carry out the work safely near live electrical apparatus as electrical worker.	2.1	OHS principles and practices to reduce the incidents of accidents are identified in accordance with given instructions, requirements and/or established procedures.
		2.2	Working safely and complying with all safety requirements for working near live electrical apparatus as an electrical worker are followed in accordance with given instructions and established routines/procedures.
		2.3	Processes for monitoring and reporting/referring hazards and OHS risks to the immediate

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ELEMENT	PERFORMANCE CRITERIA	
		authorised personnel for directions according to established procedures are followed.
	2.4	Non-routine events are referred to the immediate authorised personnel for directions according to established procedures.
	2.5	Unexpected events associated with working safely near live electrical apparatus as an electrical worker are responded to using acquired known solutions and skills related to routine procedures to ensure work instructions and established procedures are met.
3 Complete the work safely near live electrical apparatus as electrical worker.	3.1	Work schedule and anomalies for completion and checking of the work are reported to authorised personnel in accordance with established procedures.
	3.2	Processes for reporting to authorised personnel accidents and/or incidents are confirmed in accordance with established procedures.
	3.3	Requirements for returning work permit(s) and/or access authorisation permits are confirmed.
	3.4	Appropriate personnel are notified of work completion according to established procedures.
	3.5	Works completion records, report forms/data sheets are completed accurately in accordance with given instructions and established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) Essential Knowledge and Associated Skills (EKAS): This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of working safely near live electrical apparatus as electrical worker.

All knowledge and skills detailed in this unit should be contextualised to current

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REQUIRED SKILLS AND KNOWLEDGE

industry practices and technologies.

KS01-TEL16A ESI safe work practices near live electrical apparatus

Evidence shall show an understanding of ESI safe work practices near live electrical apparatus to an extent indicated by the following aspects:

T1 Electrical safety and principles encompassing:

- Hazards encountered in an electrical environment and safety procedures for dealing with them - types of hazards (hazards include electrical shock, fire from an electrical source, chemical hazards and fall hazards.), factors indicating general unsafe work practices and conditions, safety practices in the use of common tools and plant.
- Rescue techniques and first aid treatment of an electric shock victim - methods to rescue an electrical shock victim in contact with live equipment or conductors, accepted first aid treatment for burns, bleeding and shock, procedures for conducting EAR and CPR.
- Procedures for dealing with fires and hazardous chemicals associated with electrical equipment - selection and use of different types of equipment used to fight fires associated with electrical equipment, procedures for dealing with a fire associated with electrical equipment, procedures for dealing with PCBs.
- Basic circuit components and state the function of each - sources of electrical supply, control switches, types and functions of resistive consuming devices, basic circuit components symbols used in electrical diagrams.
- Connection of basic electrical circuits and measurement of circuit parameters - connection of components that make up a single-source single-load circuit, relationship between voltage and current in such circuits, consequences of a short-circuit and an open-circuit.
- Determining the voltage, current and resistance - calculation methods, measurement methods.
- Cable and conductor terminations to Australian/New Zealand standards - types of terminations, cable conductor preparation, prepare conductor for termination, termination method (conductor terminations include soldered and pressure types).

T2 Transmission, distribution and rail systems encompassing:

- Relationship between the transmission, distribution and rail/tram system within an overall power system - different organisations responsible for generation, transmission, distribution and rail/tram and, how they correlate and their functions
- Characteristics of a transmission, a distribution and a rail system - principal components, typical voltage levels and methods of transmission and distribution including grid type transmission systems, radial, parallel and ring main feeders
- Relationship between an overhead and underground supply systems within an overall power system - advantages/disadvantages, applications and the basic steps for planning and installing an overhead and underground distribution system
- Single line drawings and layouts - drawings and layouts of transmission and distribution systems including, radial, parallel and ring main feeders and the HV

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REQUIRED SKILLS AND KNOWLEDGE

equipment associated with substations

T3 Fundamentals for working safely near live electrical apparatus encompassing:

- Standards, guidelines/codes of practice, State/Territory/local government legislation, supply authority regulations and or enterprise requirements including relevant certification and licensing, applicable to working safely up to the defined "safe working zone" near energised electrical apparatus (inc. electrical powerlines) for non-electrical worker
- Definitions of terminologies - 'safe working zone' 'risk assessment', 'safe approach distances zones', 'safe working distances'.' work permits', access authorisation permits', 'Technical standards' 'isolation procedures' and compliance requirements'
- OHS policies and procedures for working safely - emergency response and First Aid procedures such as CPR, roles and responsibilities of employers, employees and other parties under OHS legislation, personal protective equipment, identifying hazards, assessing and controlling OHS risks, first aid procedures, duties of a safety observer, working at heights/confined spaces, permit to work systems and isolation procedures, safe application of different types of tools and equipment
- Operation of mobile plant and machinery (e.g. EWP) near live electrical apparatus
- Electricity supply infrastructure assets and voltages
- Techniques and precautions in undertaking different work functions and working safely up to the defined "safe working zone" near energised electrical apparatus (inc. electrical powerlines) for non-electrical worker - work functions that may be performed include, vegetation control, scaffolding, rigging, painting, and/or any other activity that requires working safely near live electrical apparatus by a non-electrical worker.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the range statement of the competency standard unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all component parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

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Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all prerequisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with

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the “Assessment Guidelines – UET1211”. Evidence shall also comprise:

- A representative body of Performance Criteria demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and range; and
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and range; and
  - Demonstrate an understanding of the essential knowledge and associated skills as described in this unit to such an extent that the learner’s performance outcome is reported in accordance with the preferred approach; namely a percentile graded result, where required by the regulated environment; and
  - Demonstrate an appropriate level of employability skills; and
- Conduct work observing the relevant Anti Discrimination legislation, regulations, policies and workplace procedures; and
  - Demonstrated performance across a representative range of contexts from the prescribed items below:

Range of tools/equipment/materials/procedures/workplaces/other variables		
Group No	**The minimum number of items on which skill is to be demonstrated**	**Item List**
A	All of the following:	Confirmation of the "safe working zone" for Safe work and access near live Electrical Apparatus Identification of the relevant technical standards. Acts, regulations and codes/guidelines Identification of

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		established (Enterprise) procedures
B	All of the following:	Confirmation of the principles of electricity, the three phase power system, electric shock and resuscitation, power system Recognition of aerial voltage systems Identification of Low Voltage Aerial Circuits Identification of High Voltage
C	All of the following:	Procedures in the event of an incident Events constituting an incident Procedures for responding to incidents Hazard and risk assessment procedure Conduct Work-site Hazard Assessment Confirmation of essential components of Hazard Assessment Checks Applying Hazard Identification in Electrical Work Confirmation of the Basic Safety Principles for Work on Electrical works Hazard Identification and Risk Assessment Hazard Control Risk Assessment and Management (JSAs)

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		Control The Hierarchy of Controls including Evaluation, Worksite Hazard and Risk Assessment Checklist, Pre-job Hazard Assessment Check (HAC) Items, Planned Inspection and Pre-Work Hazard Risk Assessment Form
D	All of the following:	Use of work permits and/or authorisation permits Sustainable energy principles and practices Possible affects of weather conditions on working near electrical apparatus as a electrical worker
E	At least one occasion	Dealing with an unplanned event by drawing on essential knowledge and associated skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials

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to safely undertake actual work near live electrical apparatus

In addition to the resources listed above, in context of and specific resources for assessment, evidence should show demonstrated competency working below ground, in limited spaces, with different structural/construction types and method and in a variety of environments.

Method of assessment **9.4)**

This Competency Standard Unit shall be assessed by methods given in Volume 1, Part 3 “Assessment Guidelines”.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this Competency Standard Unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and associated skills described in this unit.

Concurrent assessment and relationship with other units **9.5)**

For optimisation of training and assessment effort, competence in this unit is not recommended to be assessed concurrently with any other unit.

Range Statement

RANGE STATEMENT

10) This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

This Competency Standard Unit shall be demonstrated in relation to safe working so defined by relevant State or Territory regulatory agencies/bodies, local government legislation, Industry bi-partite body – Guidelines/Codes of Practices or other related

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RANGE STATEMENT

requirements for Safe work and access near live Electrical Apparatus.

Work functions that may be performed, such as vegetation control, operation of cranes, elevating work platforms, excavators, concrete pumps etc, scaffolding, rigging, painting, and/or any other activity that requires working safely and complying with requirements and/or established procedures near live electrical apparatus by a electrical worker/

Working safely up to the defined "safe working zone" near energised electrical apparatus (inc. electrical powerlines) for electrical worker including an understanding of risk assessment control measures that encompass job safety assessment but excluding any work that is or may be performed by other competent operatives within the defined "safe working zone".

Safe use of plant, equipment and tools within electrical environments including but not limited by the electricity supply infrastructure assets, infrastructure constructions and excavations including an understanding of safe approach distances zones/Safe Working Clearance, work permit(s) and/or access authorisation permits, technical standards and Industry Guidelines, rural applications, road construction, pavements and effect of inclement weather

The following constants and variables included in the element/Performance Criteria in this unit are fully described in the Definitions Section 1 of this volume and form an integral part of the Range Statement of this unit:

- Appropriate and relevant persons
- Appropriate authorities
- Assessing risk
- Authorisation
- Drawings and specifications
- Emergency
- Established procedures
- Hazards
- Identifying hazards
- Legislation
- Notification
- OHS practices
- OHS issues
- Permits and/or permits to work
- Work clearance systems

Unit Sector(s)

Not applicable.

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Competency Field

Competency Field **11)**

Entry Level – Cross Discipline Units.

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UETTDRIS44A Perform HV field switching operation to a given schedule

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This Competency Standard Unit covers the carrying out of high voltage switching operations involving the operation of circuit breaking and isolation devices from a given switching schedule and according to enterprise procedures. It also encompasses the process of; communicating with the Switching Control Officer or Electrical Control Officer, isolating the electrical equipment and the line or work site, as well as proving that the area is de-energised and earthed, issuing/accepting electrical permits and the returning of the affected circuits to service.

Application of the Unit

Application of the Unit **2)**

This Competency Standard Unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit may require a licence/registration to practice in the work place subject to regulations for undertaking of electrical work.

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License to practice **3)**

Practice in workplace and during training is also subject to regulations directly related to Occupational Health and Safety, electricity/telecommunications/gas/water industry safety and compliance, industrial relations, environmental protection, anti discrimination and training. Commonwealth, State/Territory or Local Government legislation and regulations may exist that limits the age of operating certain equipment.

Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed plus all the competencies in one (1) of the identified Pathway Unit Group(s):

Transmission Overhead

Distribution Overhead

Rail Traction

Distribution Cable Jointing

Electrical

Common Unit Group

Unit Code	Unit Title
UEENEEE101A	Apply Occupational Health and Safety regulations, codes and practices in the workplace
UEENEEE102A	Fabricate, assemble and dismantle utilities industry components
UEENEEE104A	Solve problems in d.c. Circuits
UEENEEE105A	Fix and secure electrotechnology

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Prerequisite Unit(s) **4)**

	equipment
UEENEEE107A	Use drawings, diagrams, schedules, standards, codes and specifications
UEENEEG101A	Solve problems in electromagnetic devices and related circuits
UEENEEG102A	Solve problems in low voltage a.c. Circuits
UETTDREL16A	Working safely near live electrical apparatus

Transmission Overhead Pathway Group

Unit Code	Unit Title
UETTDREL11A	Apply sustainable energy and environmental procedures
UETTDREL12A	Operate plant and equipment near live electrical conductors and apparatus
UETTDRIS54A	Install and maintain poles, structures, overhead conductors and cables
UETTDRTP26A	Install transmission structures and associated hardware
UETTDRTP27A	Maintain transmission structures and associated hardware
UETTDRTP29A	Install and maintain transmission overhead conductors and cables

Distribution Overhead Pathway Group

Unit Code	Unit Title
UETTDREL11A	Apply sustainable energy and environmental procedures
UETTDRDP12A	Maintain overhead energised low voltage conductors and cables
UETTDREL12A	Operate plant and equipment near live electrical conductors and apparatus

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Prerequisite Unit(s) **4)**

UETTDRIS41A	Install network infrastructure electrical equipment
UETTDRIS42A	Maintain network infrastructure electrical equipment
UETTDRIS52A	Install and maintain poles, structures and associated hardware
UETTDRIS54A	Install and maintain poles, structures, overhead conductors and cables
UETTDRIS56A	Install and maintain low voltage overhead services

Rail Traction Pathway Group

Unit Code	Unit Title
UETTDREL11A	Apply sustainable energy and environmental procedures
UETTDREL12A	Operate plant and equipment near live electrical conductors and apparatus
UETTDRIS52A	Install and maintain poles, structures and associated hardware
UETTDRIS54A	Install and maintain poles, structures, overhead conductors and cables
UETTDRRT21A	Install traction overhead wiring systems
UETTDRRT22A	Maintain traction overhead wiring systems
UETTDRRT23A	Install rail traction bonds
UETTDRRT27A	Install overhead traction components and equipment
UETTDRRT28A	Maintain overhead traction components and equipment

Distribution Cable Jointing Pathway Group

Unit Code	Unit Title

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Prerequisite Unit(s) **4)**

UETTDRCJ21A	Lay ESI electrical cables
UETTDRCJ26A	Install and maintain de-energised low voltage underground polymeric cables.
UETTDRCJ27A	Install and maintain de-energised high voltage underground polymeric cables.
UETTDREL11A	Apply sustainable energy and environmental procedures
UETTDREL12A	Operate plant and equipment near live electrical conductors and apparatus
UETTDRIS41A	Install network infrastructure electrical equipment
UETTDRIS42A	Maintain network infrastructure electrical equipment
UETTDRIS55A	Install and maintain low voltage underground services

Electrical Pathway Group

Unit Code	Unit Title
UEENEEE137A	Document and apply measures to control OHS risks associated with electrotechnology work
UEENEEG006A	Solve problems in single and three phase low voltage machines
UEENEEG033A	Solve problems in single and three phase electrical apparatus and circuits
UEENEEG063A	Arrange circuits, control and protection for general electrical installations
UEENEEG106A	Terminate cables, cords and accessories for low voltage circuits
UEENEEG108A	Trouble-shoot and repair faults in low voltage electrical apparatus and circuits
UEENEEG109A	Develop and connect electrical control circuits

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Prerequisite Unit(s) **4)**

UEENEEK142A	Apply environmentally and sustainable energy procedures in the energy sector
UETTDRIS67A	Solve problems in energy supply network equipment

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following scales. Description of each scale is given in Volume 2, Part 3 “Literacy and Numeracy”

Reading 3 Writing 3 Numeracy 3

Employability Skills Information

Employability Skills **5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit

Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT **PERFORMANCE CRITERIA**

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ELEMENT	PERFORMANCE CRITERIA
1 Prepare to undertake HV switching procedures to a given schedule	1.1 Switching and work schedule(s), including drawings, plans, requirements, established procedures, and material lists, are received, analysed and confirmed, if necessary, by site inspection.
	1.2 Relevant requirements and established procedures for the work are communicated to all personnel and identified for all work sites.
	1.3 OHS policies and procedures related to requirements and established procedures for HV switching are obtained and confirmed for the purposes of the work to be performed and communicated.
	1.4 Work is prioritised and sequenced following consultation with others for completion within acceptable timeframes and in accordance with established procedures.
	1.5 Hazards are identified, OHS risks assessed and control measures are prioritised, implemented and monitored including emergency exits kept clear according to established procedures.
	1.6 Relevant authority is obtained to perform work according to requirements and/or established procedures.
	1.7 Resources including personnel, equipment, tools and personal protective equipment required for the job are obtained and confirmed in working order.
	1.8 Relevant personnel at worksite are confirmed current in First Aid and other related work procedures according to requirements.
	1.9 Liaison and communication issues with other/authorised personnel, authorities, clients and land owners are resolved to carry out work where necessary.
	1.10 Site is prepared according to the work schedule and to minimise risk and damage to property, commerce, and individuals in accordance with

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ELEMENT	PERFORMANCE CRITERIA	
		established procedures.
	1.11	Personnel participating in the work, including plant operators and contractors, are fully briefed and respective responsibilities confirmed where applicable in accordance with established procedures.
	1.12	Road signs, barriers and warning devices are positioned in accordance with requirements.
2 Carry out HV switching procedures to a given schedule	2.1	OHS and sustainable energy principles and practices to reduce the incidents of accidents and minimise waste are monitored and followed in accordance with requirements and/or established procedures.
	2.2	Lifting, climbing, working in confined spaces and aloft, and use of power tools/equipment, techniques and practices are safely followed and, currency according to requirements confirmed.
	2.3	Essential knowledge and associated skills are applied for the safe undertaking of HV switching procedures to a given schedule to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements.
	2.4	Communications with Switching Control Officer are established and maintained throughout the isolation operation according to established procedures.
	2.5	Electrical equipment and associated circuits line/network or work site to be switched including paralleling is isolated and proved de-energised using appropriate devices and earthed where required according to requirements and established procedures.
	2.6	Hazard warnings and safety signs are recognised and hazards and assessed OHS risks are reported to the immediate authorised persons for directions according to established procedures.
	2.7	Unplanned events occurring during HV switching

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ELEMENT	PERFORMANCE CRITERIA	
		procedures to a given schedule are responded to and undertaken within the scope of established procedures.
	2.8	Relevant permits are prepared and issued in accordance with established procedures.
	2.9	Known solutions to a variety of problems are applied using acquired essential knowledge and associated skills.
	2.10	Ongoing checks of quality of the work are undertaken in accordance with instructions and established procedures.
3 Complete HV switching procedures to a given schedule	3.1	Work undertaken is checked against works schedule for conformance with requirements and anomalies reported in accordance with established procedures.
	3.2	Accidents and/or injuries are reported in accordance with requirements/established procedures, where applicable.
	3.3	Work site is rehabilitated, cleaned up and made safe in accordance with established procedures.
	3.4	Tools, equipment and any surplus resources and materials are, where appropriate, cleaned, checked and returned to storage in accordance with established procedures.
	3.5	Relevant permit(s) are signed off, safety devices are removed, and the system is re-energised and returned to service in accordance with requirements/established procedures.
	3.6	Works completion records, reports, as installed /modified drawing and/or documentation and information are finalised and processed and appropriate personnel and authority notified.

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) Essential Knowledge and Associated Skills (EKAS): This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of performing high voltage field switching to a given schedule.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

KS01-TIS44A High voltage switching

Evidence shall show an understanding of high voltage switching principles to an extent indicated by the following aspects:

T1 Standards, codes, legislation, supply authority regulations and or enterprise requirements applicable to switching of high voltage to a given schedule

T2 Requirements for the use of manuals, system diagrams/plans and drawings encompassing:

- Types, characteristics and capabilities of electrical apparatus
- Use, characteristics and capabilities of specialised tools and testing equipment
- Network interconnectors source of possible backfeed

T3 Role of the HV switching operator

T4 Procedures for obtaining correct HV switching authorisation encompassing:

- Identification of OHS hazards, assessing and controlling risks
- Safety procedures and precautions
- Safe approach distances
- Responsibilities and protocols
- Identifying switching resources
- Procedures for obtaining electrical access permits/authorities
- Requirements for team switching
- Procedures for coordination of operations

T5 Use and operation of equipment associated with HV overhead and substation equipment encompassing:

- Test instruments
- Sticks
- Interrupters
- Arc stranglers

T6 Operation of protection systems and substation equipment

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REQUIRED SKILLS AND KNOWLEDGE

- Note: Examples include fault levels and settings; types and applications; protection systems and substation equipment fault levels and settings; types and applications

T7 Types and categories of HV switchgear

T8 Application, function and operating capabilities of switchgear

T9 Restrictions pertaining to HV switching equipment

T10 Procedures for the isolation of HV transmission main and working earths

T11 Earthing HV electrical apparatus practices and procedures for access encompassing:

- Purposes of Operational and additional work part - on-site earths
- Factors determining the location and effectiveness of Operational earthing
- Acceptable industry procedures
- Personal protective equipment

T12 High voltage switching techniques

- Pre-switching checks
- Switching operational procedures
- Isolation procedures and proving dead/de-energised
- Earthing procedures
- Pre-switching checks
- Switching operational procedures
- Emergency fault procedures
- Energisation procedures

T13 Application and function of SWER system components

- Circuit arrangement
- Principle of operation
- Hazards and procedures associated with faulty SWER earth systems
- Procedure to isolate, energise and commission SWER substations

T14 Operation of HV overhead switching or indicating devices encompassing:

- Identifying hazards, assessing and controlling risks associated with HV switchgear operation
- Systematic and defensive techniques
- Mobile radio procedures
- Double isolation procedures
- Note: Examples include fuses; disconnect fuses; load switching; live line

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REQUIRED SKILLS AND KNOWLEDGE

indicators; capacitors; reclosers; sectionalisers, underslung links, airbreaks; switches, disconnects; live line clamps; phasing sticks; phasing tester

KS02-TIS44A High voltage fault switching principles

Evidence shall show an understanding of high voltage fault switching principles to an extent indicated by the following aspects:

T1 Primary causes, effects and types of HV electrical faults

T2 HV protection devices encompassing:

- Main components
- Types
- Categories
- Applications
- Functions

T3 Basic principle of operation of HV system protection devices

T4 Protection co-ordination and protection ―zoning

T5 HV feeder auto-reclosing suppression encompassing:

- Function
- Application

T6 Circuit condition requirements and switching considerations when paralleling and separating HV feeders

KS03-TIS44A High voltage distribution transformer principles

Evidence shall show an understanding of high voltage distribution transformer principles to an extent indicated by the following aspects:

T1 Operation of HV distribution transformers encompassing:

- Principle governing factors for transformer ratings
- Protection and alarms
- Operating limitations and the relationship between transformer and HV fuse rating
- Purpose and principle operation of HV distribution transformer tap changers
- HV distribution transformer and transformer — cable combination switching practices
- Paralleling requirements
- Isolation and earthing procedures for access
- Common distribution transformer and associated electrical apparatus faults

T2 HV underground switching equipment

- Note: Examples include arc stranglers, switch operation, load break elbows, switching cubicles, canister fuses, bayonet fuses, F and G switching cubicles, voltage indicators and phasing testers

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REQUIRED SKILLS AND KNOWLEDGE

KS04-TIS44A Feeder automation system

Evidence shall show an understanding of feeder automation system to an extent indicated by the following aspects:

T1 Function of feeder automation system and the main components

T2 Operation procedure for a remote field device from a local control station

T3 Functions of ―System Control and Date Acquisition (SCADA) (or any other relevant Data Acquisition and Control) systems and its main components

T4 SCADA system security interlocks and access restrictions

T5 SCADA system operation when switching apparatus or retrieving data via a remote access device such as; Remote Access Terminal (RAT), Dial Up Voice Annunciate System and Local Control Station

T6 Function of the main components of a local/remote control system

T7 Operation of a field devices using SCADA systems via a Remote Access Terminal (RAT), Dial Up Annunciate System and Local Control Station

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the range statement of the unit of competency and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all component parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment **9.1)**

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is

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recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all prerequisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the "Assessment Guidelines – UET12". Evidence shall also comprise:

- A representative body of Performance Criteria demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and

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range; and

- Apply sustainable energy principles and practices as specified in the Performance Criteria and range; and
- Demonstrate an understanding of the essential knowledge and associated skills as described in this unit to such an extent that the learner's performance outcome is reported in accordance with the preferred approach; namely a percentile graded result, where required by the regulated environment; and
- Demonstrate an appropriate level of employability skills; and

- Conduct work observing the relevant Anti Discrimination legislation, regulations, policies and workplace procedures; and
  - Demonstrated performance across a representative range of contexts from the prescribed items below:

Range of tools/equipment/materials/procedures/workplaces/other variables		
Group No	**The minimum number of items on which skill is to be demonstrated**	**Item List**
A	All of the following:	Approvals/clearances Access permits
B	All of the following:	HV operating sticks HV operating earths HV detectors
C	At least one of the following:	HV phasing sticks HV ground mounted equipment isolating handles and earths
D	At least two of the following:	HV links Air break switches Fuses
E	At least three of the following:	Reclosers Ring main units

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		Circuit breakers Isolators Earth switches Sectionalisers
F	At least one occasion:	Dealing with an unplanned event by drawing on essential knowledge and associated skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Context of and specific resources for assessment **9.3)**

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual performance of HV field switching to a given schedule.

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working below ground, in limited spaces, with different structural/construction types and method and in a variety of environments.

Method of assessment **9.4)**

This Competency Standard Unit shall be assessed by methods given in Volume 1, Part 3 “Assessment Guidelines”.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this Competency Standard Unit

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applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and associated skills described in this unit.

Concurrent assessment and relationship with other units

9.5)

There are no concurrent assessment recommendations for this unit.

Range Statement

RANGE STATEMENT

10) This relates to the unit of competency as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

This Competency Standard Unit shall be demonstrated in relation to the carrying out of high voltage switching operations involving the operation of circuit breaking and isolation devices from a given switching schedule.

Switching operations are confined to those performed in field situations, not in system control rooms or substations and may include electrical load transfer.

Switchgear includes reclosers, ring main units, circuit breakers, isolators, earth switches, sectionalisers, HV links, air break switches, live line clamps, and fuses.

Specialist tools may include HV phasing sticks, HV link sticks, HV live-line clamp operating sticks, HV ground transformer isolating handles and associated earths, HV overhead operating earths and HV detectors.

Switching program/schedule including necessary detail, e.g. structure, switch or equipment number; locations; HV feeder; outage times; works plan/order;

The following constants and variables included in the element/Performance Criteria in this unit are fully described in the Definitions Section 1 of this volume and form an integral part of the Range Statement of this unit:

- Appropriate and relevant persons (see Personnel)
- Appropriate authorities
- Appropriate work platform
- Assessing risk

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RANGE STATEMENT

- Assessment
- Authorisation
- Confined space
- Diagnostic, testing and restoration
- Documenting detail work events, record keeping and or storage of information
- Drawings and specifications
- Emergency
- Environmental and sustainable energy procedures
- Environmental legislation
- Environmental management documentation
- Established procedures
- Fall prevention
- Hazards
- Identifying hazards
- Inspect
- Legislation
- MSDS
- Notification
- OHS practices
- OHS issues
- Permits and/or permits to work
- Personnel
- Quality assurance systems
- Requirements
- Testing procedures
- Work clearance systems

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Industry Specific Cross-Discipline Units

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